

# AMATEUR RADIO

MARCH 1965



Vol. 33, No. 3



2/6

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## OUR COVER

Girls at St. Anne's Church of Eng-  
land Girls' Grammar School, Sale,  
who recently passed the Elementary  
Certificate under the W.I.A. Y.R.S.  
These are the first Y.Ls to gain same  
in VK3. Back Row: Anne Martin,  
Bronwyn Roberts, Sharon Budge.  
Front Row: Barbara Knight and Joy  
Byatt.

## FEDERAL COMMENT

★

## MORSE CODE EXAMINATIONS

One of the lesser-known activities of the various Divisions of the Institute is that of training classes to fit potential Amateurs for the P.M.G. examinations in A.O.C.P. or L.A.O.C.P. grades. Classes are conducted in the theory, regulations and Morse Code standards necessary to pass the relevant exam. In addition, some Divisions also run correspondence courses which enable country aspirants to study in the same way as his town brother.

It has been fairly common practice by the Department to keep the level of their theory and regulation exams. consistent throughout the Commonwealth and between town and country, but this has not been so in the Morse Code exam. Different examiners in each State and the local Postmaster generally in country centres has led to considerable differences in the standard of the "fast" by which candidates pass or fail.

The learning of the Morse Code depends largely on the patience and perseverance of the instructor, and of course the desire of the aspirant to learn. The Institute has had some remarkable instructors in the past—in VK3 in particular, those who learnt under the late Herman Asmus, VK3ET, had to be good operators or one did not even get to the exam. A succession of Institute instructors in the various States has no doubt followed somewhat similar but individualistic lines. Most can be said to have had one thing in common—they were good instructors with more than average "fists", otherwise they did not hold their job.

Whilst it can be said that a good c.w. man can copy any "fast" served up to him, this is not true of the average student, particularly under examination conditions. He will need at least 4 w.p.m. "up his sleeve" and some good sending to boot. We believe that in the country particularly, many students have to try to copy a local Postmaster who perhaps has not sent Morse for years and this, added to the general stress of the exam, leads to a greater failure rate than should be the case.

In the interests of uniformity and in common with teaching practices established in other fields of education, we consider the time has come for the use of tape recordings, all of the same operator, who is an expert, so that the Morse Code exams. throughout the country will be the same and put all students on the same common basis for the receiving test. The machinery for implementing such a system should not be insurmountable by the Department which is generally well supplied with modern equipment.

By adopting such a system, the country stands to gain quite a few more c.w. operators which the nation will still need in time of emergency, but which at present may forever remain an L.A.O.C.P. despite his desire to be a full licensee. This innovation by the Department would be an incentive to Institute instructors and students alike.

FEDERAL EXECUTIVE, W.I.A.

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# THE MINIWHIP

## EFFICIENT MULTI-BAND HELICAL WHIPS

MAX J. SWABY,\* VK4DA

MY XYL insisted that if the Tri-Band Swan went into the Valiant it must look respectable, both inside and out. This meant that the centre-loaded 8 to 12 foot whip was out and the finished job must therefore look like a car radio antenna and be only 4 feet odd in length.

Very little of a practical nature has been published in regard to home-brewing the Helical Mobile Whip, hence the above ultimatum indicated an investigation of the Helical, and, leaving out the blood sweat and tears that went into finding out the hard way, the following is a summary of constructional details of whips for 80, 40 and 20 metres. The figures given and the

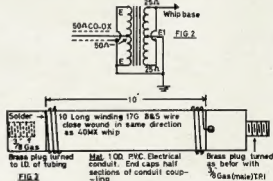
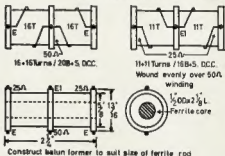
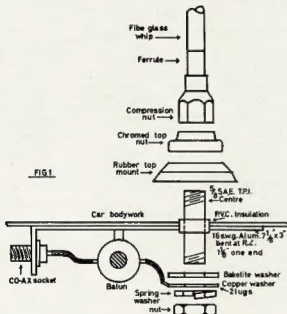
sistently work DX during the period of band openings with surprisingly solid contacts, with reports varying from S5 to 20 db. over S9. All the above results are naturally under mobile conditions, and on each band the antenna loads heavily and presents a flat line to the Transceiver without the fuss that fractures 6DQ5s.

Each whip is wound on a 4 ft. 8 in. length of tapered fibre-glass fishing rod 8 mm. diameter at the base and 2 mm. diameter at the tip. A 2" ferrule is glued to the base with epoxy resin glue and the ferrule end of the whip is chucked into an electric drill for winding, with the tip suitably supported to stop whipping.

**80 Metres:** Use 27 gauge B. & S. and completely fill the whole rod with close wound turns. This will be approximately 3.6 Mc.

Further experiments have now been carried out on the idea of the combination whip for 80 metres whereby the 40 metre whip is screwed to the top of a Resonator, the whole tuning to 80 metres, and as the results have been so promising constructional details of the Resonator are shown in Fig. 3.

Various tests indicate that the combination produces about 3 db. more signal Interstate than the straight 80 metre whip wound with 27 gauge wire. This is probably due to the lowering of IR losses by the use of a larger gauge



conclusions reached are my own and are no doubt open to argument—but please not with me. The theory behind Helical Whips is somewhat contentious and I just don't know enough to argue the matter. They really work and work well; how or why they work is someone else's worry.

The 80 metre whip will produce S7 to S9 reports from 2L at night when conditions are right, and usually S7 over 1,000 miles odd around VK. The 40 mx job produces S5 reports from G land during the later afternoon when conditions are normal, and compares favourably with fixed station antenna set-ups. The 20 metre whip will con-

### CONSTRUCTIONAL DETAILS

**40 Metres:** Use 21 B. & S. tough enamelled wire and solder the first turn to the top of the ferrule. Starting at the ferrule wind 20 turns close wound, then 2 turns spaced over 4", and the remainder of the rod is close wound to the tip. The resonant frequency will be about 6.95 Mc.

If difficulty is experienced in acquiring the right size of rod materials, these blanks are readily available from Len Butterworth Pty. Ltd., 389 Stanley St., South Brisbane.

**20 Metres:** With the same gauge wire wind 6 turns over 2 1/4" and the remainder close wound to the tip. The resonant frequency will be about 14 Mc.

wire on a larger former, and this is further borne out by an apparent increase in the Q of the combination, making it very frequency conscious with a bandwidth of only about 30 kc.

The base impedances of the above antennae will be very close to 25 ohms and will vary somewhat with mounting position, car construction, and fibre-glass characteristics. The base is coupled through a ferrite-cored 2 to 1 impedance ratio transformer and then by the shortest length of 50 ohm co-ax. back to the transceiver. The 50 ohm impedance figure was decided upon because a few commercial mobile transceivers use a fixed 50 ohm output, and these will load nicely to the above set-up.

\* "Timberline," M.S. 902, Dalby, Qld.

## TUNE-UP

An Antennascope is recommended for accuracy, but a grid-dipper will do almost as well. Couple the dipper (or dipper and antennascope) to the transmitter end of the co-ax, and a dip will be found corresponding to the above-quoted frequencies; other dips are also present but can be ignored. Assuming that the car is reasonably removed from nearby reflecting or absorbing surfaces, the tip of the whip can then be trimmed with side-cutters, a few turns at a time, until just below the desired frequency. Then turn on the mobile transceiver and enough antenna radiation from the g.d.o. will leak through to give a signal. Trim one turn at a time from the whip tip and by following the g.d.o. on the receiver, the antenna can be put exactly on frequency.

From experience I find that recommended centre frequencies for the whips are 3.65 Mc., 7.090 Mc. and 14.250 Mc. These frequencies you will find are the most useful for mobile operation and the ones most likely to produce the maximum number of QSOs.

**Bandwidths:** The following figures are not on a db. rating, but the efficiency falls off rapidly past these limits:

3 Mc.	.....	40 Kc.
7 Mc.	.....	60 Kc.
14 Mc.	.....	150 Kc.

## MOUNTING

My mounting is on the top of the rear office mudguard, but any position reasonably high on the car and removed from the turret (or upper body portion of the car) is satisfactory. Bumper mounting is **not** recommended as it will drastically alter the base impedance and bring the high current portion of the whip close to the bodywork, resulting in a decrease in efficiency.

Fig. 1 shows details of the mounting arrangement I use, the materials being readily available and the construction requiring only simple hand tools. The centre threaded portion, the top insulators and the bottom fittings, being all parts from Astor "Air Chief" car aerials of the 1948-55 era, and the bottom tubular section of this aerial will provide the ferrules mentioned above. The whip nut is a 3/4" gas compression nut (3/8" S.A.E. thread) with 3/8" internal bore and will fit the whip base ferrules which are belled at the bottom for a push fit into the compression nut. The mounting plate is 16 s.w.g. aluminium, shaped to fit the body contour at the mounting point.

Remove the paint over the area of contact between the car body and the mounting plate. By extending the thread on the centre portion of the Astor fitting and running the thread completely through the top chrome plated nut about 3/8" thread will be available at the top to hand tighten each whip into position as required.

## COVERING

For mechanical and moisture protection, the whips are covered with epoxy resin glue ("Araldite") by applying an even coat and drying to a smooth transparent surface for a few minutes in front of an electric radiator, turning the whip to ensure an even flow of resin. They are then hung by

the tip to dry for 24 hours. A better appearance and better protection may be obtained by covering with plastic tubing. Use 6 mm. tubing and cut a length 12" longer than the whip and after closing off each end, immerse the length in pure benzol until the whole length is soft and supple.

Trim the closed off ends and slide one end as far up the whip as possible, then by applying a regulated 10 to 20 lbs. of air pressure (or oxygen) to the open end the plastic can be slipped the full length of the whip with a lot of urging. The pressure must be watched, as it's quite disconcerting, and very noisy, when excessive pressure blows a hole in the tubing.

The base end is temporarily tied in position with tape and the tip end of the tubing is stretched until it follows the whip taper. Glue the top few inches of the whip, winding with an adhesive that does not attack the tubing, and tie into position until the glue dries and the tubing reforms to the shape of the whip. If the type of plastic tubing which will decrease diameter 50% upon the application of hot air can be obtained, the covering problem can be greatly simplified.

After each whip is completed, the tip must be covered by a plastic cap or the top three inches of the whip will burst into flame during the first damp day. This cap assists also in the reduction of corona noise during mobile reception. Suitable caps are obtained from small continent tubes (Golden Eye Continent, etc.) and are easily screwed onto the top few turns and cemented into position.



The above photo shows the author and his 40 metre whip on car mount. An assortment of experimental whips is leaning against the rear of the car. The author is holding a 40 metre midjet that will work interstate but with lowered efficiency and was wound only to find out if a helical 12 inches long would load and radiate.

## IMPEDANCE TRANSFORMER

Details of this transformer are as shown in Fig. 2 and particularly watch the winding arrangement. The circuit as shown is correct although the phasing arrangement of the coils does look unusual. These transformers are available at a price that makes home-brewing dubious as the high frequency core material is somewhat difficult to obtain.

## COMMENTS

These whips are naturally not as efficient as a properly matched 10-foot centre loaded job, but the difference in performance would have to be measured as comparisons against both commercial and home-brew centre-loaded jobs showed no apparent difference. The 80 metre version is a compromise because the fibre-glass pole is not large enough to hold the right length of a heavier gauge wire. Its performance can definitely be improved by using a 5-foot length of larger diameter with 21 B. & S. wire although a slight base impedance mismatch may occur.

As indicated earlier in this article, the trimming to frequency is very critical and if you end up with a whip that is too high in frequency, the frequency can be lowered with top capacity by replacing the plastic tip cover with a metal cap of a length sufficient to bring the whip back to resonance. A 1" long cap will lower the frequency about 75 kc. on 40 metres.

If on completion the whip is slightly low in frequency, the resonant point can be raised by a shorted turn of 3/4" wide shim brass over the plastic cover on the lower portion of the whip, which will produce a shift in the order of 25 kc. on 40 metres.

As the whips will run warm, when loaded to a Swan, at an area one-third of the length from the base end, it is considered that winding the first third of the whip with say 16 gauge B. & S. wire and the remainder with 26 gauge would produce a more efficient whip.

Although parallel rod in suitable diameters is readily available, tests have shown that due to the weight of the wire concentrated at a height above the base, the constant pendulum effect fatigues the rod at the mount and fracture eventually results. This can be obviated by moulding a thicker section for the first few inches. Fatigue and pendulum effect are not present with the tapered sections as described above.

The work done on the above whips has been most interesting and very worth while as far as results go. Possibly in this article I have missed a point or two, and if anyone desires further information I can be found around 3.875 Mc. almost any night or around 7.1 Mc. mobile on week-ends. Please don't write for details as I just have not the time available for correspondence.

An idea for an efficient 80 metre whip which has not as yet been tried, would be to wind a base section of 16 B. & S. approximately 2 feet long on 3/4" fibre glass. This would have a male union on top to take the 40 mx whip. This would give an overall height of 6 feet odd and increased efficiency, but would necessitate experiments with

(Continued on Page 18)



# PEAK MULTIMETERS



**MULTIMETER 400J**

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DC Amps: 50  $\mu A$ , 500  $\mu A$ , 2.5 mA, 25 mA, 250 mA. (150 mV).  
Ohms: 0-5K, 0-50K, 0-500K, 0-5M.  
Scale Centre, Ohms: 48, 460, 4.6K, 46K.  
Db: -10 to +5, 0 to +22.  
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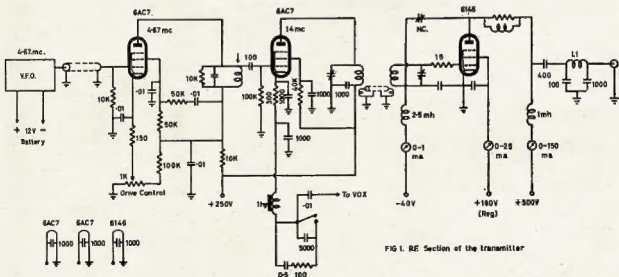
## PEANUTS ON TWENTY METRES

**W**ELL you can never tell what will happen! One evening I thought I would make a bistable multivibrator to be flipped over to amplify ticks from my watch so that I could adjust its speed. The ramifications of this idea led to the construction of binary counters, gated amplifiers, coincidence detectors and finally a tiny computer. But this wasn't all: I had to make a WWV receiver—double conversion, crystal-locked on 10 Mc.—to provide the second pulses for comparison with the pips from my watch. To make the comparison a slow time base, long persistence c.r.o. was necessary: this evolved into a direct display electrocardiograph.

but nothing else resembling English  
voice sounds.

## THE TRANSMITTER

power only. The two 6AC7 stages are built on a 7" x 4" x 2" chassis and the final amplifier on a chassis of the same size. The transmitter is keyed in the cathode of the tripler stage and the filter gives a very pleasant keying characteristic. I found that keying the battery lead of the v.f.o. caused a decided terminal click.



off, the aerial was thrown over to the transmitter and the transmitter came on—all with the first depression of the key. I stopped sending and these conditions were reversed. I had been brought up on switches, and this was heaven. In the case of the present transmitter I wondered if I could catch another glimpse of heaven. After a few false starts, I remembered a vox control I had used on a.s.b. way back and which, somehow, had remained intact.

In Fig. 1 you can see that, when the key is depressed, a negative-going pulse can be obtained from the cathode side of the key and each time the key is depressed more negative pulses are produced. The vox-box had inputs from speech amplifier and receiver audio and simple experiment showed

which was the correct lead to use—and also that the idea worked. Pressing the key down operated the relay in the vox which in turn switched the antenna relay, turned on the v.f.o. (it is battery operated), and disabled the receiver. The vox relay release could be adjusted to hang on as long as necessary between words, and when the over was finished the whole set-up changed back to receive conditions. (See "Single Sideband," A.R.R.L., 1954, p.168, for circuit of the vox. One amplifier and one diode can, of course, be omitted in this application.)

Finally, a spring-loaded switch was placed in the battery lead to the v.f.o. for netting purposes—the amplified fundamental signal on 4.67 Mc. gives just sufficient harmonic output on 14 Mc. for this procedure. If the trans-

mitter is lined up on about 14.05 Mc. it will operate satisfactorily throughout the c.w. band (14.0-14.1 Mc.) without retuning and only slight adjustment of the drive control is necessary.

## COMMENT

The signal will not compete with 150 watts and a three element beam, but it has worked through to the east coast of the U.S. and Europe. When I finally get frustrated by the higher powered stations and their beams I'll try a larger final amplifier—there should be enough drive voltage available. In the meantime the "peanut" (as the west coast kilowatters call it) is giving me plenty of amusement, and the XYI can still watch her t.v. set now that I have put a high-pass filter in its feedline. The beam for the t.v. set is out of sight in the attic just above the unshielded transmitter.



## HOME-BREWED COMMUNICATION MIKE

WALT ROGERS,\* WIDFS

THANKS to Al Glines who receives "Amateur Radio" in the Boston area, I have had a chance to read a few copies of "A.R." which suggest that an article on a home-brewed communication mike may be of interest. Perhaps I can needle cobbler George VK4JP so as we can make an occasional contact, as it has been a long time since our "eyeball" QSOs of 1944.

For Amateur communications, the audio range should be about 250 to 4,000 cycles and flat. I like it flat so that no peaks limit our reaching for 100% modulation before most of our voice is at this level too.

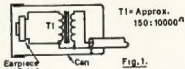


Fig. 1.—Diagram of Communications Mike.

While making many tests on old and new headphones, I noticed that one series was designed for an unusually flat audio response. This was the HS-33 (or the ANB-H-1 separate units). These units are electrically and acoustically adjusted for the desired audio range. My first try was to step up the impedance from about 150 ohms to 10K, with the aid of a surplus transformer costing less than one dollar. This transformer and mike unit were mounted in a small tin can. The shielded lead connected to the mike fitting at the modulator. This works well in place of a crystal mike, but with lower gain—about minus 58, if I remember.

Then came the revelation that the ear pieces of our telephone handsets now are a dynamic unit and might give better output. I was given a couple of these units (not borrowed, really!)

(Continued on Page 18)

\* 24 Orient Avenue, Melrose, Mass. 02176, U.S.A.

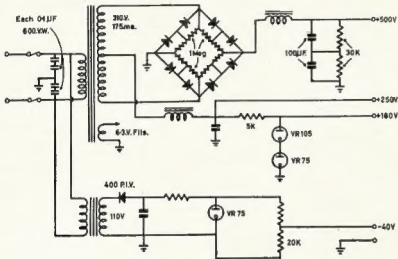


FIG 2 POWER SUPPLY

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## TRANSISTOR MODULATOR TIP

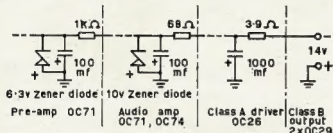
ONE of the main troubles encountered in a mobile transmitter using a transistor d.c.-d.c. converter and a transistor modulator is the "hash" appearing on the common battery supply rail, giving rise to annoying noise on the signal. This "hash" finds its way back to the low level input of the modulator and due to the low impedances involved in the supply rail, it is very difficult to eliminate.

The modulator constructed for my mobile (40 watt Mullard design) suffered from this trouble until a 10 volt and a 6.2 volt Zener diode were included in the circuit shown in Fig. 1. Since these diodes were included the problem has been almost entirely over-

come and only when the signal is extremely strong are any reports of "transistor whine" received. These diodes also have the advantage of reducing the tendency for the modulator to "take off" when the battery voltage is low and its supply impedance is higher than normal.

The mobile transmitter uses a 70 watt d.c.-d.c. inverter of Philips design, using OC28s and the modulator is the 40 watt Mullard design using OC29s in the output stage. The transmitter uses an 815 in the final, running about 45 watts input on 52 Mc. Total transmitter battery drain under average modulation is about 9 amps. from a 12 volt supply.

—G. BYASS, VK5ZDB.



TRANSISTOR MODULATOR MODIFICATIONS  
(Balance of circuit as per published  
Mullard Modulator circuit)

Fig. 1.

## Your Pye Reporter with a Variable Frequency Receiver

FOR some time now I have been toying with the idea of making the Reporter unit I described some months ago able to receive the stations not on net frequencies.

The circuit shown herewith uses a pentode master oscillator and the triode as a cathode follower.

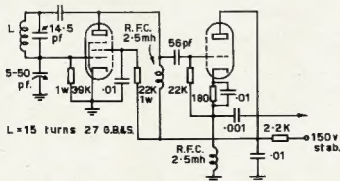
I don't claim the circuit as original, but it is simple to get going, extremely stable, simple to build, and easy to tune.

The output is fed from the oscillator through co-axial cable to the crystal

socket, and because one side of the crystal is grounded, the job is so much easier. The crystal is removed and out of circuit completely. The oscillator covers approximately 1.5 Mc., quite sufficient because the top half meg. of the 8 metre spectrum is rarely used.

It will be noted that by virtue of their construction, the Reporters are fairly critical in their serial and r.f. assemblies. For best results, peak on your most often used frequency and then be able to tune either side of your selected frequency for about 800 kc.

—David Priestley.



## Establishment of a 144 Mc. Beacon

A keen group of Darling Downs and Brisbane Amateurs have combined to establish a 144 Mc. Beacon on the Bunya Mts. at an elevation of approx. 3,500 ft. above sea level, and excellent results are expected. The site is approx 120 air miles west of Brisbane.

The group was started by Noel 4NH, of Toowoomba, who has made a transmitter available for use in the project and also a place to house the transmitter at the intended site.

A lot of work will be necessary before the transmitter is operating, such things as F.M.G. permission, checking, wiring of transmitter and alterations, making up of antenna, automatic keying device.

John 4ZWB and Bert 4CP are doing the necessary checking of the transmitter. Brian 4RX is designing and building the automatic keying device. Mick 4ZAA and Tom 4ZAL are constructing the antenna system.

The transmitter is an Admiralty Type 8C and is in reasonably good order. As soon as it has been checked, it will be re-assembled at John's QTH. It will then undergo on-the-air test transmissions for some time to ensure that it is operating 100% efficiently.

It is not considered a matter of urgency to have it installed on the Bunya Mts. immediately. The V.h.f. Group interested in the project can rest assured the transmitter will be operating from the Bunya Mts. for the next v.h.f. season, but if all goes well it could be operating much sooner.

Valves throughout the transmitter are not usually seen and all concerned consider it unwise to install the unit without a spare and complete set of valves.

If spares cannot be obtained readily the group have come to the conclusion that the transmitter will have to be converted now to easily obtained types of valves. As all v.h.f. Hams would appreciate, this would entail a lot of extra work and hold the project up, and it would mean completely rebuilding the transmitter, etc.

If anyone feels inclined to help the project and have on hand any of the following valves in the junk box, donations would be appreciated. Contact John 4ZWB or Bert 4CP.

The following valves are required as spares: CV187, KT8C, KT86, TZ40, 834 or DET12, 304B, 3-50G2, TB1/60G, VH50. Local offers of valves should contact Mick 4ZAA or Tom 4ZAL. Thanks chaps.

Later on, when all of the work has been done on the transmitter and everything is working satisfactorily, all will be advised of frequency and date of coming into service. Also an address to send reports of transmission to will be arranged.

This Beacon is coming into being in the interest of v.h.f. and will be operated and maintained by those interested in v.h.f. in the interests of v.h.f.

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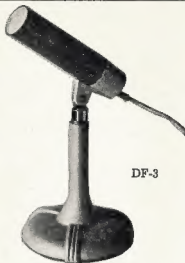
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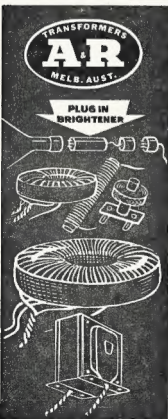
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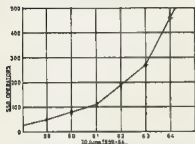


# ARE YOU IN THE GROOVE?

LINDSAY DOUGLAS,\* VK2ON

Australian stations using s.s.b. equipment at 30th June:—

1959	50
1960	80
1961	110
1962	190
1963	270
1964	462



These figures, gathered carefully by Comps. VK5EF since his advent on sideband, show that increasing numbers of Amateurs are getting out of the groove and applying new techniques to their operating. Other information is that the average age of a sideband operator is 50 years. Maybe that average would be the same for the whole 4,500 Hams in VK. But the point is that the average Ham has had 30 years of operating and has, until recently, used the same procedures in contacts with other stations.

## IMPROVEMENTS IN PROCEDURE

What improvements in procedure are demanded by s.s.b. operation if its many advantages are not to be wasted? How easy is it for a 50-year-old Ham to change to new operating procedure?

"VK5XYZ from VK3BCD. All okay Joe, a very good transmission, no trouble at all. You're just booming in here . . ."

"This will be my last over, Bill, I won't bother coming back. VK-5WXY to VK4MNP."

"I'll just get a Roger from you, Mac, on that little point. Break, VK-7LMN from VK3CDE"

Just how redundant are all these words when one uses s.s.b.? All one has to do is ask a question and let go the button.

How good is the memory of the average 50-year-old? Not very good if it's anything like mine. Well then, why not deal with one point at a time and save the memory? I'm not talking about 3, 4 or 5 way QSOs, only two way.

## VOX OPERATION

A lot of newcomers to sideband have bought a box and the box has a "vox" but it might as well have a knife-switch considering the way some of them use it. The "vox" is good if it is

working well, but can easily be replaced by a push-button or morse-key correctly used. The chief ills of the "vox" are:

- Its clicking disturbs the operator.
- It hangs on too long, and the first words of the other party are lost.
- Its operation is not stable with varying mains voltage.
- Receiver muting not fully effective.

All of these deficiencies can be rectified by correct adjustment of the "hold" and "anti-vox" controls, using voltage regulation on the control tubes, and muffling of relays with rubber from mountings or box.

What is the ideal length of a transmission on s.s.b. operation?

Would your answer be 5, 10, 20 or 40 seconds? In other words, do you monitor the channel while you are talking? If so, how many times in a minute is this done? I would think 10 seconds answers the first question and five times a minute the second one. How many times have you heard s.s.b. stations "doubling"? How many words are lost upon the ether because of this? The answer would be "very few words" if the five times a minute rule was adhered to.

Have you ever heard Jim telling you all about the article in "QST" when you'd read it right through the previous night? Did you want to stop him and tell him you knew all about it, so as to save his precious operating time? Were you able to do so without waiting 3½ minutes? The five times a minute rule would allow you to get a word in edgeways, then you could ask Jim about something more to the point.

Have you noticed how easy it is to "break" some s.s.b. stations? As you know, this should be done with due courtesy and at an appropriate pause in the conversation, but how valuable is this new facility if only to arrange a sked with an old clobber!

## AUTOMATIC GAIN CONTROL

Another desirable feature for the 1964 type of QSO is a.g.c. in the receiver. Those who haven't got it don't know what they are missing. Can a.g.c. function when the b.f.o. is on for sideband reception? Well I admit that in an unmodified BC348 (1944 model) things are a little difficult. However, those who have heard the a.g.c. action in a Drake 2A would not be happy until this smooth feature was incorporated into their own receiver.

What is the use of a.g.c. when copying sideband? Well, you see, the various stations come in at varying strength and, if a VK6 calls you when you're copying a VK3, you want to be able to hear him. The instant-acting, slow-decay a.g.c. system is perfect for copying in this situation. A separate a.g.c. amplifier (see p.95, R.S.G.B. Handbook) produces a very smooth action, effective on very strong signals.

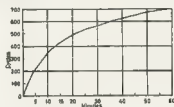
## RECEIVER MUTING

Receiver muting connected to the push-to-talk switch may seem an unnecessary thing on which to comment. However, one does meet an occasional newcomer to sideband who is not alive to its value.

## FREQUENCY STABILITY

"My set is really stable, I put it on zero-beat and it stayed there all day." This might mean something or nothing. How many of us with black boxes have put them through the hoops to find out their drift rate in the first hour?

"Mine's a Bloggs transceiver and that's the best you can get." Unfortunately there are good and bad specimens among commercial gear and, as we know, every model has approved modifications published every few months to cater for unsuspected minor defects in design. Measuring the drift rate of your model can be done by producing a 500 cycle note, beating the v.f.o. against the crystal calibrator. Then this 500 cycle note is compared with another audio tone from a calibrated audio oscillator. This comparison can be done by ear, or on the c.r.o., and a reading taken every five minutes over the first hour. The following graph is that of an HT32:—



How significant is drift in a sideband QSO? Have you ever heard three stations in QSO on three separate frequencies? Have you ever heard two stations on different frequencies? Can you imagine the effect on a.w.l.s and other Hams who may be reading the mail? Drift is very important in s.s.b. contacts for obvious reasons:

- Two stations on one frequency take up less spectrum than two on two frequencies.
- A drifting station may drift on to another QSO, causing interference.
- As just mentioned, it makes the a.w.l.s task more difficult.

## NETTING

Now with the HT32 as shown, one should re-net every 50 cycles during the drift period and this would be 14 times in the first hour. With a transceiver, the receiver and transmitter frequencies should be identical (not always the case if power supply stabilization is defective) and here the v.f.o. stability requirement is less exacting due to automatic adjustment in the re-

ceiving mode. For this reason (and others) many a.s.b. men prefer transceivers.

## MULTI-WAY QSOs

Are multi-way QSOs on sideband a good thing? Well, they were an excellent idea when there were few sideband stations about. One could always get a QSO by chipping into an existing contact, whereas calling CQ often brought no result (especially if one had a weak signal). These days the multi-way QSO has bad as well as good points. The whole smoothness and convenience of a rapid-fire contact is lost by converting it into a multi-way. However, one should observe that additional persons can join or leave the party with equal facility, proper courtesy being employed. Perhaps one wishes to converse with one of the gentlemen on a matter of personal interest, then it's an easy matter to say "See you up five kc, Joe," and he replies, Roger, excuse me fellers! and the move is effected.

## SIGNAL REPORTS

Signal reports are of secondary importance to the sideband operator. One knows by the tone of the answers whether one's copy is QSA5. In fact it is common to forget about reports until the end of the contact and then obtain one for the benefit of the log book. Likewise automatic repetition of messages is bad practice. The other fellow will ask for a report if he requires it. These operating practices mentioned in a list of rules by VK3AHR in "A.R." several years ago, but the number of sideband operators has quadrupled since then.

Always give honest reports on signals heard, report them as you hear them, mention your receiver, for this helps the other fellow to correctly interpret your report. Please accept the other fellow's report with good grace, he's not trying to be funny, only helpful and isn't that what we want?

Now that s.s.b. signals are dominating the bands, let us have better operating habits, and help show the unenlightened that a code of discipline can be maintained, from which we all benefit.

## AUTOMATIC LEVEL CONTROL

Has your sideband transceiver been modified to give automatic level control? Half a handful of parts and a couple of hours' work will do the job. What advantages does this modification confer? It will allow you to concentrate more on the talking and less on the dancing meters. Also accidental fat-topping (with wide signals and needless interference with other stations) is prevented. Most transmitters can be modified easily. This is the simplest form of audio peak compression. Where it is difficult to install, a form of audio compression as used in i.m. transmitters would be fairly effective after proper adjustment. A simple a.c. circuit is shown on page 19 of "A.R." for August 1962.

Just take a careful listen on the bands next week-end and see if you observe any of the phenomena referred to. Here's to better, brighter and breezier sideband contacts. ●

# CORROSION

WG-CDR. C. G. HARVEY,\* VK1AU

● The Amateur's Code suggests that Radio should not be one's sole interest in life. VK1AU reports how a problem encountered in yachting, found its solution through electronics.

**L**AST year, after some modifications in VSI, I noticed a new aluminium alloy centre-plate on my International "Snipe" racing dinghy was showing some discolouration near the attachment of its hoist cable.

To a sailor, who is primarily an Amateur, it was soon obvious that the trouble sprang from the effects of dissimilar metals. The alloy plate was attached to its stainless steel shackle by a copper rivet, while the shackle was in contact with a brass thumb, to which a steel cable hoist was attached!

The gaps in the Table do not indicate the absence of a potential difference, such as would be encountered with brass, nickel and copper combinations. Potentials below ½ volt have been eliminated in pursuit of the corrosion criteria suggested above.

The Table shows that it is difficult to avoid electrolytic corrosion and suggests that our outdoor equipment deserves an occasional inspection.

If you have a meter which gives reasonable indications below 1 volt, test runs can be done on your own bench. Simply use wet blotting paper as an electrolyte, and measure the potential difference across the two sample metals in contact with it. It may take a couple of hours for a steady reading to appear.

Oh the boat? It was cured by replacing the copper rivet with one of mild steel! ●

	Alum.	M. Steel	Lead	Tin	Brass	Nickel	Copp.	Silver	Indium
Aluminium	—	—	—	0.25	0.4	0.4	0.55	0.8	—
Mild Steel	—	—	—	0.3	0.4	0.35	0.3	0.5	—
Lead	—	—	—	—	—	0.3	0.25	0.55	—
Tin	0.25	0.3	—	—	—	—	—	—	—
Brass	0.4	0.4	—	—	—	—	—	—	0.25
Nickel	0.4	0.35	0.3	—	—	—	—	—	0.25
Copper	0.55	0.3	0.25	—	—	—	—	—	0.3
Silver	0.8	0.5	0.55	—	—	—	—	—	0.6
Indium	—	—	—	—	0.25	0.25	0.3	0.6	—

Table 1 (in Volts)

Although the electrolytic effects of adjacent metals was obviously unknown to the VSI "mandore" who installed the new plate, it was obvious that the installation was "live".

A little research<sup>1</sup> soon showed that quite high potentials could be developed in fresh water, let alone in the salt (?) water of Johore Strait. For those who have noticed similar effects, a few figures might be of interest.

The following table shows the weight lost or gained by 20 square centimetre samples, subject to six months' exposure in tap water:—

Mild Steel	lost	16 milligrams
Brass	lost	2 "
Lead	lost	292 "
Tin	lost	3 mg. "
Copper	gained	4 "
Aluminium	gained	1 "

Based on such physical changes, it is accepted in some quarters, that corrosion will be held to reasonable levels if the maximum potential difference between adjacent surfaces is kept to less than ½ volt in sealed equipment, ½ volt in normal equipment, or ½ volt in equipment exposed to "severe" environments (e.g. aerials).

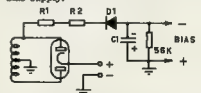
So let us now look at the size of the potential which is generated by a film of fresh water between two dissimilar metals. See Table 1.

\*Dept. of Air, Canberra, A.C.T.  
<sup>1</sup> Marconi Review, XXVII, No. 153.

## BIAS THE EASY WAY

**T**HE battery is the most used source of bias in use by Amateurs today. The system described here is not new by any means, but out of five Hams I have discussed it with, only one had ever used it, and three had never heard of it.

Using this method any voltage can be obtained very easily. Although only half the transformer is used, the balance will not be upset very much, certainly not enough to cause concern. True the voltage is only half wave rectified, but that is quite sufficient for bias supply.



R1, R2—Determined by required voltage drop. C1—50 µF, 150v. electrolytic. D1—AA119, OA81, OA85, OA210, etc.

R1 and R2 form a voltage dropping network, whilst R3 is sufficient to "fire" the diode to get it all working.

C1 is a 50 µF, 150v. working electrolytic to "smooth" the voltage.

—David Priestley.



Mr. W. Hayden (seated at mike), M.H.R. for Oxley, officially opened the Ipswich and District Radio Club (VK4IO) by sending greetings and congratulations to Australia-wide Amateurs. With Mr. Hayden are (left to right) Dave Ness (President), Bill Jehn (Publicity Officer), Dave Cooper (club member), Wayne VK4ZBN and Bob VK4LI.

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## OPENING OF VK4IO

Mr. W. Hayden, M.H.R., officially opened the Ipswich and District Radio Club station with a broadcast message of greetings and congratulations over VK4IO, call sign of the club's station.

The club is divided into two sections—seniors and juniors—and there are 24 members in each section.

The opening ceremony was conducted at the Darling Street residence of Mr. Bob Linscott, the club's class manager, who constructed the transmitter used by the group.

Mr. Hayden, speaking to an invisible audience, the members of which might well have included overseas Hams, said he hoped the members of the Ipswich and District Radio Club would derive much pleasure from their club, and that what they learned as members would be of value to them.

"Amateur Radio is a very enjoyable pastime," said Mr. Hayden, "and does a lot for the betterment of the city."

The President of the club (Mr. D. Ness) said that the aim of the club was to interest boys in the fundamentals of radio, and perhaps give them enough knowledge to be able to apply for a Radio Amateur's licence.

"There are 18 Amateur Radio operators in Ipswich at present," he said.



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85A2 10/-, EF37A 9/-, QQV06/40 90/-, QE04/7 25/- with socket, TT15 15/- with socket, 832 10/-, QS108/45 10/-, 6AC7 4/-, 6AG5 10/-, 6AU6 6/-, 12BA6 10/-, 12BE6 10/-, EL81 9/-, 185BT 7/6 or three for £1, EF70 15/- dozen, EF73 15/- dozen, EA76 15/- dozen, DET22 10/-.

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# The Historical Development of Radio Communication

J. R. COX,\* VK6NJ

## PART FOUR—THE ADVENT OF THE VALVE

### CHAPTER THREE

Marconi's successful bridging of the Atlantic with wireless telegraphy in 1901 commenced the present epoch of radio communication. By 1910, with a regular trans-Atlantic system installed, wireless communication attained a state of technical certainty. In hand with this, experimental findings indicated that, as well as telegraphy, speech could be broadcast. Associated, though they were, the transmission of the human voice posed distinct problems when compared with wireless telegraphy. Valiant efforts were made by notable pioneers to overcome these problems even before the advent of the transmitting valve, upon which ultimate success depended.

The detailing of the progress made in wireless telephony before the amplifying valve, experimental findings important because it illustrates firstly the tenacity of the early inventors and, secondly, this pre-valve phase cultivated a "know-how", a demand for, and an interest in speech and music transmission. It was in this field of wireless communication that radio later was to find its greatest strength. By cataloguing development a realistic appreciation of the valve's worth, in developing wireless communication, is established. The story of the wireless valve is very largely the story of the development of wireless communication as we have come to know it.

Problems confronting early pioneers of speech broadcasting can be conveniently divided into two categories, namely, problems of transmission and problems of detection. An appliance capable of producing continuous uniform electro-magnetic waves had to be engineered and then these waves had to be manipulated by a voice-operated mechanism to form radio frequency pattern replicas of the spoken words. At the reception and the receiving wireless set had to be quantitative in operation, not merely set into operation by the arrival of electro-magnetic waves, like the coherer, but capable of producing an output proportional to the transmitted modulated radio frequency speech waves. That, then, was the task, and no wonder the comparison of difficulty between wireless telegraphy and telephony was likened to being "not far from that between ruling a dot and dash line and making a dry-point etching of an autumn landscape."<sup>1</sup>

It became clear to early inventors that the achievement of any practical success in the transmission of clear speech depended upon the production of a device to generate continuous, uniform electro-magnetic waves of a high

frequency.<sup>2</sup> The plan was to vary the amplitude of this series of constant high frequency waves by impressing on it the instantaneous values of audio-frequency voltage derived from sounds of speech by means of a microphone. This system, later termed amplitude modulation, is still universally used today. Alexander Graham Bell's microphone was adaptable for converting voice energy into audio-frequency voltage and so the search resolved around a generator of high frequency waves.

At first the sole means of generation available was by Hertzian methods and so, naturally enough, attempts to gain the desired high frequencies centred around experimenting with spark-gap transmitters. Research in this direction was led by Mr. W. Duddell who engineered a "musical arc". The device was an arrangement of condenser and inductance connected in series with their terminals attached to solid carbon rods of a continuous arc which emitted a note of high pitch. The frequency of the resultant oscillatory waves approximated 10,000 cycles per second.<sup>3</sup>

In 1903 Mr. V. Poulsen engineered an improvement when he arranged the electric arc between the end of a thick carbon rod, kept in slow, steady rotation, and a water-cooled rod of copper. The arc, set in a box of coal gas or vapour of hydrocarbon, was subjected to a very strong transverse magnetic field. This was successfully applied to the transmission of speech. Still other contrivances were made to produce the high frequency waves needed. One such derivation, engineered by Telefunken of Germany, used a set of twelve copper-carbon arcs set in series. A reasonably undamped continuous output resulted and was successfully employed for speech transmission.

Opinion was divided on the best way to generate the necessary high frequency waves to carry the speech transmission. One section believed the answer to be spark-gap transmitters, whilst yet another school championed high speed revolving alternators. The use of alternators in wireless communication stems from their initial use in generating alternating current electricity. Alternators were pioneered by Nikola Tesla who, in 1888, used them for powering carbon lamps.<sup>4</sup> A low frequency alternating current caused

the lamp to emit an irritating hum. Tesla stepped up the frequency and during his experiments constructed an alternator capable of a frequency rating of as high as 12,000 cycles per second. Wireless experimenters knew that the minimum requirement for speech transmission is in the vicinity of 30,000 cycles per second, so they set about improving alternator design. Modified alternators using flexible leather belts and powered by steam turbines soon became capable of frequencies as high as 75,000 cycles per second. It was an American, Mr. R. A. Fessenden, who successfully put the alternator into use as a mechanical oscillator for speech transmission.<sup>5</sup>

The application of this system to wireless communication was restricted for two main reasons. One was the cost, especially if it installed on train or ship, where special provision was necessary, to stop gyrostatic action damaging the rapidly revolving bearings as the conveyance pitched and rolled. In addition, the power expenditure to turn the alternator at the necessary high speed was considerable, due to air and bearing friction. Thus, mechanical oscillators were useful in proving speech transmission possible, but in full-scale use were not entirely practicable.

To facilitate modulation of the oscillator's output a microphone had to be coupled to the oscillator circuit. In theory there are two ways of doing this; by direct insertion into the oscillator circuit or in a circuit inductively coupled to it. Either way provides means of controlling the amplitude of the emitted electro-magnetic waves in such a manner that the amplitude varies in exactly the same way, and proportional to, the sound waves actuating the diaphragm of the microphone. In practice this theory was not easy of accomplishment before the advent of the amplifying valve!

The main trouble was that the oscillator depended upon very high voltage, but the carbon microphone could not cope with more than a few volts and about one half an ampere in current. Hence the enormous energy of the oscillator had to be controlled by a microphone, robust enough to withstand excessive voltages and current, yet delicate enough to respond to the relatively weak power of the voice waves produced when speaking. The solution was not to eventuate until the amplifying valve arrived. Before this, in the absence of any device to amplify the microphone's output, microphones were designed to suit the means and many ingenious devices eventuated.

One of these featured water as a coolant to combat overheating, and another used eleven microphones in parallel actuated by the one central mouthpiece. The latter type was used when the microphone circuit current exceeded one half an ampere. This arrangement distributed the current

<sup>1</sup> High frequencies were necessary to continuously carry the speech pattern. If sufficiently high frequencies were not generated, breaks and interference to the music or speech being broadcast became noticeable. As well, the higher the frequency the shorter the wave length, and, as the most efficient radiation occurred when the antenna was an integral multiple of one half wave length, the use of higher frequencies also gave antennas of manageable size; e.g. a frequency of 1,000 cycles per second would be best served by an antenna 66.6 miles long. At 200,000 cycles per second an antenna 33.3 ft. long gives just as efficient radiation.

<sup>2</sup> The importance of Duddell's contribution was that he showed a way to produce a near-continuous high frequency oscillation against an intermittent series of oscillatory spark discharges.

<sup>3</sup> United States Information Service; op. cit., p. 31.

<sup>4</sup> Fleming; op. cit., p. 368.

\* Government School, Yornup, W.A.

<sup>1</sup> Ballantine, S. "Radio Telephony for Amateurs", Chapman and Hall, London, 1904, 2nd edition, p. 13.

and tended to lessen the alarming effects of carbon heat-up and the objectionable arcing between the carbon granules. Another intriguing example was devised by Professor Majorana, of Rome. Named a "Liquid Microphone," it took advantage of the property of fluid jets.<sup>1</sup> The intensity of jets of slightly acidified water was varied according to the vibration of a voice-actuated diaphragm. The fluid was sprayed onto an insulated cup placed between two electrodes, so that a film of conducting solution, varying in thickness, offered a varying resistance to the passage of electrical current. Variance of resistance caused variance of oscillations in the antenna and therefore of the amplitude of the radiated waves. This remarkable microphone was successfully used and possessed the advantage of not generating heat like the carbon microphone. In addition, it could operate with much higher voltages without the arcing associated with carbon microphones.

Whilst these developments were taking place the receiving side of telephony was also being investigated. By 1906 a United States Army General, H. H. C. Dunwoody, discovered that mass carbonium held a unique property of value to wireless communication.<sup>2</sup> This property was the ability of the carbonium crystal to rectify by virtue of its unilateral conduction. Furthermore of this line of investigation is associated with the names of two experimenters, Professors Pickard and Pierce, who observed unilateral conduction in other substances such as hesalite and anatase. General Dunwoody was the first to apply this special property of crystals by using one as a detector of wireless waves. By employing the crystal in a receiver circuit, using headphones, he was able to detect telephony and telegraphy. Selectivity was poor, but this, in the early days of wireless, was no drawback due to the comparative paucity in number and wide spacing of transmitters.<sup>3</sup>

Another form of detector attracting notice in the first decade of the 20th century was the "Ionised Gas Oscillator Detector".<sup>4</sup> This item was destined to have a pronounced effect upon the future rise of wireless communication. It originated from a "plaything" put aside no less a renowned inventor than Thomas Alva Edison. The early history of this device really precedes Edison's interest in the subject, since as early as 1873, the connection between heat and its effect upon electricity was being investigated. This preliminary work formed the basis for a more detailed study of the phenomena associated with the emission of electricity from hot bodies. Also Elster and Geitel had conducted systematic investigation on the subject between the years 1882 and 1889 and their work did much to advance the discovery of

the vacuum tube.<sup>5</sup> These two men arranged a metallic filament and a metallic plate within a glass bulb which was evacuated of air using a vacuum pump. They then connected a battery to the filament and regulated the temperature of the filament by varying the current passing through it.

Subsequently they discovered that the plate received a positive charge of electricity which increased in value as the filament temperature was raised to yellow heat. If the temperature went beyond that point, the positive plate charge decreased until, at white heat, the charge was very small indeed. Later Elster and Geitel also discovered that the electrification of the plate depended upon factors such as the nature of the gas inside the bulb and the actual substance forming the filament as well as upon the temperature of the filament. These preliminary investigations into thermionic currents were not directed specifically towards perfecting wireless valves, but they were the initial step towards them.<sup>6</sup> These two experimenters had, in fact, established that there were thermionic currents and that basically the current could be controlled by filament composition, heat and the nature of gas through which the emission occurred. The establishment of these basic facts was an essential step and of fundamental importance.

In the year 1883 Thomas Alva Edison, whilst experimenting with his newly invented carbon incandescent lamp, took investigations into thermionic currents a step further ahead. It was then that he found that if the plate was connected through a galvanometer to the positive terminal of the battery heating the filament, the galvanometer registered current which seemed to flow from the positive side of filament to the plate and then through the vacuum to the heated filament. Apart from confirming the work of Geitel and Elster, Edison's importance in this field of research is his establishment of the fact that hardly any current flowed around the circuit when the plate was connected to the negative battery terminal. Thus he founded the principle that the plate must be positive in respect to the filament for flow of thermionic current. Another most important aspect was his finding that the current would flow in one direction only. These peculiarities were given the name of "Edison Effect". They pointed the way to the use of a similar device as a unilateral conductor for detecting electro-magnetic waves. Thomas Edison did not concern himself with this significance, however, and indeed he gave several of his bulbs to a visiting English engineer, Sir William Preece,<sup>7</sup> to take home and "play with."<sup>8</sup>

## TWO-ELECTRODE VALVES

Sir William Preece was an associate of Professor J. A. Fleming, who had, for several years, been keenly following the progress of wireless communication. It was Professor Fleming who realised the possibility of developing Edison's device for use in wireless wave reception. Modifying the bulb arrangement into a more suitable form, Professor Fleming called his device an electrical valve<sup>9</sup> because of its ability to permit electrical current flow from filament to plate but not in the opposite direction. Professor Fleming then utilised this property of his thermal electrical valve to separate the positive and negative constituents of an electro-magnetic oscillation emitted from the antenna of a wireless transmitter. In this way the positive currents may be said to be sifted out and allowed to pass while the other set of currents were withheld by the valve. The emitted waves then formed a pattern capable of operating a telegraphy recorder or a telephone earpiece.

Thus the first thermionic valve entered wireless communication in 1904. Its successors were to have a dramatic influence upon the future development of wireless.

Marconi used Fleming's valves as oscillation detectors for wireless telegraphy early in 1905 after Professor Fleming had patented the device in November 1904. Later Fleming improved the emissive qualities of his two-electrode valve through superseding the carbon filament by a tungsten one which could be heated to a higher degree and nearer to the critical temperature discovered earlier by Elster and Geitel.<sup>10</sup>

For some two years the two-electrode valve remained at the stage and wireless communication languished for the want of a device to amplify weak signals, amplify weak voice currents for successful modulation and generate an unbroken uniform stream of high frequency electro-magnetic oscillations.

## THREE-ELECTRODE VALVES

When Heinrich Hertz illustrated the properties of wireless waves in 1888, a young man, then fifteen years old, may have heard of the incredible demonstrations. This youth later studied at America's Yale University and received his doctorate for a thesis on Hertzian waves. He was Lee de Forest, later the inventor of the three-electrode vacuum tube. This dynamic device revolutionised wireless communication and made long distance radio part and parcel of everyday life. The world learnt of the new vacuum valve when Dr. de Forest announced his "Audion" in 1906.<sup>11</sup>

The Audion, designed by Lee de Forest, consisted of three electrodes; filament, plate and a third called a grid inserted between the first two. All were enclosed in an evacuated glass tube with external terminals. The purpose of the grid was to control the flow of electrons from filament to plate. When the grid voltage was made slightly positive in respect to the filament, the

<sup>1</sup> Ibid., p. 358.

<sup>2</sup> Ibid., p. 473.

<sup>3</sup> The influence of this early work with crystal detectors on the development of the transistor is explained in the next chapter.

<sup>4</sup> L. Zehnder used such a device as a detector of Hertz oscillations between 1893 and 1895, but only experimentally. Fleming, op. cit., p. 478.

<sup>5</sup> Preliminary investigations into the phenomena of thermionic currents were started by F. Guthrie and then by Elster and Geitel (see footnote 2). See Scott-Taggart, J.: "Thermionic Tubes in Radio Telegraphy and Telephony"; Wireless Press, London, 1934, 2nd edition, p. 1.

<sup>6</sup> Elster and Geitel's work was even preceded by F. Guthrie who noted the effect of a red and white hot metal ball upon an electro-scope in 1873. Scott-Taggart, op. cit., p. 1.

<sup>7</sup> Sir William Preece was Engineer-in-Chief of the British Government Telegraph Service in the General Post Office.

<sup>8</sup> Lemon and Ference, op. cit., p. 603.

<sup>9</sup> Fleming, op. cit., p. 478.

<sup>10</sup> See Appendix I, Principles of Vacuum Tube Operation.

<sup>11</sup> Scott-Taggart, op. cit., p. 36.

grid assisted greatly the attractive force of the plate. This important factor accounts for the tremendous magnifying effect of the three-electrode tube." Here, then, was the appliance to amplify weak signals and voice currents and, with its coming, wireless communication awoke to vast new horizons. It was indeed the keystone of modern wireless.

Apart from the tremendous fill-up given to wireless development, the introduction of de Forest's Audion valve had two other sidelights. One of these was the appearance of some uniquely designed valves, mainly evolved to circumnavigate the bonds of patent rights and also to capture the imagination with something "new". One valve had its grid outside the glass envelope but still between filament and plate. Another used two metal plates arranged on either side of the filament—one used as a plate and one as a metal grid. These and other arrangements preserved the action of de Forest's triode valve.<sup>10</sup>

The other sidelight was the development of litigation between Fleming and de Forest. Professor Fleming claimed that de Forest's valve was not an essentially different invention from his own two-element tube. On the other hand, Dr. de Forest asserted that his valve was the result of his own research. Controversy reigned, but the fact remains that de Forest was the first to insert the third element in a vacuum tube. Called a grid, this element made his valve capable of producing amplification whereas Professor Fleming's was not.

The German Telefunken Company was amongst the first to use the principle of de Forest's discovery. Their design was unique because the anode did not take the shape of a disc or plate, but consisted of a spiral of aluminium wire. The dimensions of this valve are historically important because they provide a standard to judge today's trend towards valve miniaturisation. The valve measured fourteen inches long and was four inches wide. At first the general tendency was to cement the glass bulb in an insulated base and connect the electrodes to a bayonet or screw-type socket which fitted plug on the wireless set base-board. Introduced later were plugs in the form of split pins which fitted into special valve holder sockets. The plugs were made so that the valve could only be inserted the correct way; this practice still prevails, although, as valves had more elements added, the additional safeguard of a lug on the valve base with corresponding slot on socket became necessary.

One of the failings of the first valves was that they were soft. That is, they were not highly evacuated and contained residual gas. As a result their plate voltage tolerance was low with about thirty volts the maximum. Application of a voltage above this critical value caused the gas in the valve to ionise which, in turn, caused plate current to rise rapidly and the valve literally burnt out. This defect made the earliest valves unpredictable in

action and needful of very careful voltage adjustment. If valves were to improve in amplification and efficiency the inventors needed to devise a hard valve—one capable of high voltage operation.

The man to accept the challenge and eventually overcome the defect was Langmuir. He dispelled the earlier contention that gas was indispensable to valve operation. It was earlier thought that the thermionic currents were caused by some chemical action between the filament and its surrounding gas. Irving Langmuir proved, however, that a high vacuum did not stop the thermionic current and that in fact high voltage operation was possible under vacuum condition.<sup>11</sup> This work was further advanced when better evacuation methods became available. Improved pumps gave a better vacuum to the valve, and this was further advanced by the development of a process called "gettering". A small plate holding a portion of magnesium was fitted inside the valve bulb and after evacuation the magnesium was electronically ignited causing reaction with any remaining gas, so that the valve became "harder" still and so more stable in operation.

This increased the scope of application of the valve, which up to the time of the First World War was confined to use in radio receivers. It now became standard practice to use Fleming's diode as a detector feeding its output into the de Forest triode for amplification. This system of detection and amplification is retained to the present; even transistor receivers use the same combination. Thus the two antagonists, Fleming and de Forest, were to see the results of their experimentation and legal battles utilised in harmony—side by side.

## VALVE OSCILLATORS

There was another very important property of the three-element valve yet to be recognised and applied to radio communication. That was the property of self-oscillation and regenerative amplification, and about the initiation of the use of this property controversy still exists. Lee de Forest, E. H. Armstrong, J. L. Hogan, A. Meissner and Irving Langmuir all claim the distinction.<sup>12</sup>

This property of the three-electrode vacuum tube consists of transferring some energy back from the anode of the valve to the grid circuit. By judicious arrangement of a circuit, it was found possible to feed back the correct proportion of energy from plate to grid to keep the valve oscillating. This means of initiating self-oscillation was introduced near to the start of 1913 and proved of tremendous value, both for the reception and generation of continuous, uniform electro-magnetic waves. It was to prove the answer to the problem of breaks in continuity of speech, met with in spark-gap transmitters used for telephony. Thus by 1914, because of the valve, wireless communication had increased its efficiency and range. The onset of the

1914-1918 World War furthered this state of utility, as the demand for improved systems arose.

## TETRODE VALVE

Valves were first used for wireless telephony at the start of the war, and, in 1914, several systems were put forward for the generation and modulation of continuous waves. Radio telephony was responsible for the insertion of the fourth element in the valve. This occurred in 1916.<sup>13</sup> The General Electric Co. inserted a second grid to further improve means of modulating. This innovation increased the amplification efficiency of the ordinary triode tube because it corrected a noticeable defect in their behaviour. This defect was two-fold; instability caused by inter-electrode capacity which itself caused unwanted reaction between plate and grid circuits.<sup>14</sup> The capacity also had the effect of increasing the space charge near the plate and this congestion of electrons reduced the amplifying efficiency of the valve. The four-element valve was later termed a tetrode and still finds use in wireless communication.

Thus the First World War proved a stimulus to wireless communication and at its conclusion a good standard had been attained. Telephony, with valve oscillators and modulators, had proved successful. Continuous wave transmissions had been used with the resultant advantages of less power expenditure, less local interference and with greater range when used in conjunction with regenerative receivers. Indeed, it is recorded that the first German Broadcasting Service began in May 1917 when music and news were broadcast to troops on the Western Front.

When the conflict closed, scope existed for the peaceful adaptation of techniques developed under the stimulus of war. In 1919 daily, experimental, speech transmissions commenced in Germany at Königswusterhausen and reports of reception came in from Moscow, Sweden, Holland, Britain and Yugoslavia.<sup>15</sup> Just one year after, the American presidential election results were reported by radio for the first time. In the same year Dame Nellie Melba sang on the English radio network and was heard in Milan, Italy.

## PUBLIC BROADCASTING

Just as Marconi's trans-oceanic telegraphy stirred public interest, so did these, and other telephony broadcasts over distance, catch the imagination of all. The enthusiasm of the public engendered a demand for valves and parts to build receivers. Commerce, not long released from defence contracts, was able to supply components at reasonable cost.

Wireless valves, although used in regenerative receivers made available to Amateurs in 1916, however did not

<sup>10</sup> Ibid., p. 378.

<sup>11</sup> Edwin Howard Armstrong also discovered a way of combating this defect of triode valves. His system is known as "radio noise".

<sup>12</sup> The space charge is a cloud of negative particles of electricity occupying the space between filament and plate electrodes. C. D. Child first explained the space charge in 1911. Scott-Taggart, op. cit., p. 9.

<sup>13</sup> Gertmann, op. cit., p. 114.

<sup>14</sup> Ibid., p. 378.

<sup>15</sup> Ibid., p. 378.

<sup>10</sup> See Appendix 2.

<sup>11</sup> The "triode" was the name given to a three-electrode valve by W. H. Eccles. This term persists today. Scott-Taggart, op. cit., p. 36.

<sup>12</sup> Langmuir's work extended over 1914 and his patent for a "hard" valve was issued in July 1914.

<sup>13</sup> Scott-Taggart, op. cit., p. 288.



# STOP — COMPARE ... THE FACTS AND FEATURES!

And you'll see why GALAXY TRANSCEIVERS set the pace; and the standards others try to match. Below are IMPORTANT COMPARISONS why the GALAXY V. and III. are the best buy in a SSB/CW TRANSCEIVER.

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\* Write for detailed information.

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Feature Numbers:	1	2	3	4	5	6	7	8	9	10
GALAXY V.	X	X	X	X	X	X	X	X	X	X
COLLINS KWM2			X	X	X		X			X
DRAKE TR-3	X			X	X		X			X
NATIONAL NCX-5				X			X	X		X
SWAN 350	X				X					

### THREE-BAND TRANSCEIVERS

GALAXY III.	X	X	X	X	X	X	X	X	X	X
NATIONAL NCX-3									X	

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- Have carrier suppression in excess of 45 db. and unwanted sideband suppression in excess of 55 db.
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## PRINCIPLES OF VACUUM TUBE OPERATION

## The Diode

With filament heated and plate voltage switch open, the filament emits small particles of matter called electrons. The electrons tend to concentrate in the vicinity of the filament.

When positive voltage is applied to the plate the negative electrons are caused to be drawn over to the plate (Edison Effect, and an electronic stream commences to flow.

## The Triode

For a given filament temperature the current passing from plate to filament in a diode depends only on the difference in potential between them. By the insertion of a third electrode in the form of an open wire mesh, amplification becomes practicable. Just as the plate attracts electrons when it is positively charged, so will the third element called a grid, if a positive potential is applied to it. The electrons attracted towards the positive grid speed up and most will shoot past the open grid to the plate and thus increase current flow.

Because the grid is nearer to the filament than the plate, it is better placed for attracting the electrons. The result is that one volt positive on the grid has a larger effect on the plate current than one volt positive on the plate. For example, an increase of one volt positive on the grid may have as much effect as ten volts in the positive plate voltage.

A similar type of control exists when the grid is negative. If the negative grid voltage is reduced by one volt, it may have the same effect as leaving the grid voltage unchanged and increasing the plate voltage by ten volts.

In either case the valve is said to have an "amplification factor" of ten. No matter how feeble are the fluctuating positive or negative voltages applied to the grid, a relatively large effect on the plate current results. Thus even very weak signal impulses applied to the grid will cause relatively large plate current variations. It is in this action that the triode has the ability to amplify feeble wireless signals.

★

## Publications Committee Reports That...

Correspondence has been received from the following VKS 497s, 527B, 50D, 52EW, 52C, 52Q, 53XQ and L5067, in addition technical articles were received from VK5BI and D. Priestley.

Many copies of "A.R." are being returned to P.O. Box 36 as "not known at address". Readers of "A.R." should notify any change of address as soon as possible in writing, it is possible that by the time the change has been put through the system "A.R." will be forwarded to the correct address. Members of the VKA should notify their Division Secretary and non members should notify "A.R." direct. By attention to this matter your files of "A.R." will be complete.

Arrangements are currently being made to print a monthly Prediction Chart and this will be commenced as soon as plans are completed and the blocks are ready.

Readers will note in addition to the VKS notes, and in fairness to 5PS it must be stated that he was unaware that this postscript was to be added. The Committee considered that this special note was typical of 5PS that all should be permitted to know of it, and laugh with, not at, VK5PS.

Attention is drawn to the Oscar Project and it is hoped that all members of the VKS will have equipment fully prepared by now you make way for the serious experimenters.

All H.F. net users of Channel A (145.85 Mc.) are requested to keep this frequency clear at all times except in emergencies, whilst Oscar III. is operative.

By your co-operation you will assist a serious Amateur experiment of great importance.

It is interesting to note the interest caused by the article on "Lasers" plus the fact that the VKS needed to keep this frequency clear at all times except in emergencies, whilst Oscar III. is operative and is not intended to be an unappreciative remark upon the subject. This comment was during our meeting and caused much laugh, hence it was reprinted.

tion of frequency modulation" for audio transmission of programmes. Frequency modulation is unique because it eliminates static. Major Armstrong was indeed a great pioneer of wireless communication and many of his contributions to the science form the basis for today's excellence in radio. He died in 1954 at the age of sixty-four.

Edwin Howard Armstrong's life encompassed the years of the thermionic valve's dominant influence in the development of wireless communication. During his time the valve had been discovered, improved, utilised to the full and then shown signs of decline as a governing factor in the future of radio. The improvements noted over the years were the development of the hard valve, increased emission capabilities, more efficient collection of electrons at the plate and lessening of valve size.

Increased emission was secured by making filaments from thoriated tungsten which also had the advantage of optimum emission at a lower temperature than pure tungsten. A still more efficient emitter was discovered in the nickel base sprayed with a mixture of the alkaline earth metals such as calcium and barium. Better control and collection of electrons emitted came with the insertion of the suppressor grid and the development of beam tetrodes—a valve with four elements and deflecting plates to beam electron flow.

The problem of annoying receiver hum developed by filaments heated by alternating current was resolved with the advent of indirectly-heated valves. In this type of tube the emitter is a cylinder enclosing, and insulated from, a heater consisting of a thin spiral of wire, much like a miniature household radiator, which heats up the emitter to start electron emission.

Just before the 1939 war an effort was made to reduce valve size on this factor, together with the adaptability of dry-cell battery supplies, contributed towards the introduction of an era of portability in wireless communication. By 1945 valves had been made the size of a lipstick tube and radio had entered the phase of portability proper. Even so, with all the innovations thermionic valves were not entirely reliable. The battle against long distance had been won because of them, but the struggle for reliability had not.

"Whilst the I.R.E. booklet claims that Armstrong invented the system, the basic principle of frequency modulation—the variance of frequency in accordance with the intelligence—was known just prior to 1914 but was practised. Major Armstrong was the first to conceive the idea that "frequency modulation might be a better system from the standpoint of noise discrimination" and he was the first to practise the theory of frequency modulation. He experimented from 1925 to 1937 and his results in "results in an acceleration of development in this field." The quotes come from Nilsson and Horning: "Practical Radio Communication", McGraw-Hill Book Company, New York, 1954, and edition, pp.388 and 398.

Valves suffer the disadvantage of falling because of the extremely high operating temperature of the filament, which, like a light globe, eventually burns out. It has been said that "over ninety per cent of the failures of the vacuum tube electron tube are due to the failure of the electron tube." "Transistor Fundamentals and Applications," a 43-page journal issued by the Radio Corporation of America and printed in Camden, New Jersey, U.S.A., 1958.

become freely available until 1921." This action motivated the remarkable period in wireless communication "when the wonders of wireless broadcasting seized the imagination of the people." During this time, roughly from 1921 to 1931, valve production soared from 101,960 to 49,325,410 in the United States of America alone. Enormous quantities of other components were marketed and full-scale production of complete sets began. "A wireless craze hit the world and cultural life changed as man entered into the new stage of his existence—the stage of public broadcasting, brought about by the advent of the wireless valve. With it public broadcasting and long range telephony were made possible.

By 1936 direct speech transmissions between Australia and America had been tried and between Australia and Europe were commonplace. Because of the overwhelming influence of the thermionic valve, wireless communication by then had developed to the stage where it had "annihilated distance and banished isolation, and banded together the peoples of the earth closer than a crowd in a room."

## SUPERHETERODYNE RECEIVER

In terms of the thermionic valve and its application to the advancement of wireless communication, one man's contribution is outstanding. An American born in New York on 18th December, 1889, Edwin Howard Armstrong began experimenting with radio receivers while still at school. His boyhood interest led to a lifetime of service devoted to the science of wireless communication. He first came into prominence with his development, in 1913, of the regenerative circuit. Apart from beneficial factors already presented, this arrangement made loud-speaker reception possible. Five years later, Major Armstrong evolved the superheterodyne receiving circuit which tremendously improved wireless receiver sensitivity, quality and amplification. This type of receiver circuit is still universally used in ordinary domestic-type receivers.

Two other important processes in the development of radio communication were invented by this man, who became a Doctor of Science, Columbia University, in 1929. One was the superregenerative circuit which made for greater amplification and high frequency short-wave broadcasting. Television systems use his other important inven-

"American Radio League: "The Radio Amateur's Handbook", Rumford Press, Concord, New Hampshire, U.S.A., 1956, 6th edition, p.5.

"Randell, W. L., "S. Z. de Ferranti and His Influence upon Electrical Development", Longmans Green and Company, London, 1946, new edition, p.15.

"United States Bureau of the Census per notice from State Library, Perth, W.A.

"Mr. W. M. Hughes, Minister for External Affairs, Australia, at the 1954 International Radiotelegraph Convention, Sydney April 1953: Institute of Radio Engineers Austl., op. cit., p.6.

"From a four-page booklet issued in honour of "Edwin Howard Armstrong, 1889-1954" by the Institute of Radio Engineers, 1954.

# Correspondence

Any opinion expressed under this heading is the individual writer's and does not necessarily coincide with that of the publishers.

## R.D. CONTEST RULES

Editor "A.R." Dear Sir,

From time to time participants in the Remote-Contest are asked to make suggestions with the object of, if possible, making improvements. Perhaps if you could publish the following letter, some interest might be engendered in the appropriate quarter.

During the last three Contests I have observed the Contest during the full period and wish to suggest a change in the rules. I believe this suggestion to be an extension of Leith Cotton's suggestion of two years ago. I believe that three faults exist in the Contest at present:—

- (a) There is, generally, no opportunity for Limited Licensees participation.
- (b) The points range between the various States is much too wide.
- (c) There is not quite enough activity to keep an efficient operator busy; during the last few hours of both Saturday evening and Sunday afternoon everyone seems to have worked everyone.

Fault (a) needs no comment, and in any case this was the point covered in VK5GOL's suggestion.

Because of fault (b), it is just not worthwhile wasting time making contacts for one point each, when other contacts are worth ten or six times as much. There should be some differences, of course, particularly in a few years' time, when shorter skip allows easy contact with nearer States, but at present VK3 is always passed over given a choice for a more valuable contact. This discriminates against the larger States.

Killing for faults (b), the number of contacts made by the leading stations increases each year, but for a Contest of this type one would expect contacts to be made at the average rate of thirty or forty per hour.

The cure for these faults would be to increase all the points' values at present given for any contact by one, or two, or three, as a point for an intrastate contact. This would allow v.h.f. operators, using the three common v.h.f. bands, to make a reasonable score, and the extra v.h.f. activity should increase the possibility of interstate contacts. Exactly the same argument applies for L3 Mc. On the L3 bands the number of contacts that can be made would be increased without adding to the GRM.

There should be a separate section for v.h.f. only operation, as there is for c.w., phone, etc.

This suggestion has been discussed with several of the R.D. higher scorers and they all seem to be in agreement. It has already been made individually, some years ago, to the Contest Committee by VE2AEM and myself. I have tried to reach the Contest Committee through the "channel" in no avail. Possibly this letter may enlist some support from others more active or successful in Contests than I am.

Let's face it—at the moment it would be difficult for a VK3, VK8 or VK9 not to make the highest score; it is apparently only because of a lack of activity of operators that S.A. does not win the Contest each year. Therefore, in all fairness, this suggestion should come from this State and not from one of the larger States.

Another point in the rules that might be considered is the question of log keepers. There is nothing in the rules at present to suggest that, as well as all operation, all log-keeping and other miscellaneous station functions should be done by the nominated operator himself. In some overseas contests this is specified, and A.R.R.L. have stated that it is understood in all their single-operator contests. To have an assistant log-keeper has become almost universal in the R.D. among the higher scoring stations. This is a little unfair on some country station operators who cannot get help, but it does add to the enjoyment and atmosphere of the Contest as a whole. "Loggers" could be either banned or encouraged, or perhaps a multi-operator section introduced.

However, this last paragraph is merely an observation—the alteration to the points system is the important one.

L. H. Vale, VK5NO.

## LAZERS

Editor "A.R." Dear Sir,

I wish first of all to commend your magazine for the informative articles such as the

one on Lasers and the Historical Development of Radio Communication.

However, as I have often found in the past with articles of this nature, it is often worth to double check some of authorities to whom discoveries are credited.

In another technical magazine I found an item on Lasers. It was recent (December 1964 issue) and pointed out that among the 1964 Nobel Peace Prize awards was one "for original research work which led to the creation of the Quantum Generators and Amplifiers known as Lasers and Masers."

This Nobel award for Physics was shared by three scientists—Nicolai Basov and Alexander Prokhorov, both of the U.S.S.R., and Charles Townes, of the U.S.A.

I am sure that other readers would, like myself, have assumed that, as pointed out on page 17, column 1, Theodore Maiman had invented the Laser using Ruby.

Obviously this was at best very misleading. Of course it is possible that the writer of the article did not intend such an assumption, but it was bound to be made and it is obviously not justified by the facts.

After all, only one award can be made for original work which led to the development of Lasers and Masers.

I have for a long time now been aware of the parallel scientific work being done in many countries over the years, and I am sure that probably readers are not, and it demands of all of us as scientific and objective assessments of the results of this research work, not something narrow or parochial, which comes to correspond to truth.

—V. E. Richardson, VK5XQ.

Editor "A.R." Dear Sir,

In the January 1965 issue you printed part 1 of an article about Lasers. Unfortunately this article does not explain why such a device produces light with a narrow frequency band. Normally the optical atomic transitions mentioned have a spread of about 1,000 Mc. However, the Laser with mirrored ends behaves much like a long piece of transmission line. Clearly only certain frequencies are permissible. That is those with a voltage node on the mirrored surface.

Now, when some noise radiation inside the band of frequencies of optical transitions passes between the mirrors it excites transition and hence the wave grows stronger as it is reflected. It should be remembered though that only those frequencies for which the distance between mirrors is an integral number of half-wavelengths can be amplified. Normally several such frequencies exist within the bandwidth of the optical transition.

Apart from this point, I believe that the article is very good and should help a few VKs get to know something about Lasers. One day they may even use one!

—P. J. Wilson, VK5ZV.

[Is it all done with mirrors?—Ed.]

.....

Editor "A.R." Dear Sir,

In your January issue on "Amateur Radio" you published an article on "Lasers" which was reprinted from "QST" for August 1964.

I now wish to point out some errors in this article which I have already pointed out to the Editor. The "CQ" in fact not only you reprinted the drafting errors in the "CQ" article, you have also added some extra ones.

On page 18, third column, line 14 (Jan. issue) the Editor has written "in fact not only you reprinted the drafting errors in the "CQ" article, you have also added some extra ones."

As you can see from the corrections I have made, you have made all the E1 and E2, M1; in fact due to this, one error in "CQ" has been corrected.

I feel that unless these corrections are made anyone reading the article cannot gain full understanding of how Lasers work as this diagram is really the most important one in the whole article.

—G. C. Ramsey, VK5GD.

## RADIO THORAX

Editor "A.R." Dear Sir,

As an XLV about to embark on her studies for an Amateur Operator's Licence, I have discovered that several well known radio phrases have lost their original meaning. I feel that other beginners will benefit if I list a few of the phrases here, with their new meanings.

XLV: Provider of infinite number of cups of tea and coffee.

"I'm using a simple dipole"—I'm using a 6-cm beam.

"Just a little of home-brew I knocked together"—I have a KWME.

"QST 5 down"—Anything between 5 and 10

"I will QSL"—Send me your card first.

QRX—Hold on a minute, mate, can't you see

I'm talking to someone else!

"Yaw signals are fading"—I'm fed up with

this QSO.

"I'm going QRT"—I'm winding down the

band and see if I can't find some rare

DX.

Hope these will prove helpful!

—Helene M. Schroeder (Mrs.).

★

## HOME-BREWED MIKE

(Continued from Page 8)

for a go on what they would do as a microphone pick-up. And I can vouch that this unit does a swell job of it. Your ear piece may be even better.

The circuit is simple—see Fig. 1. The transformer can be almost any line or mike to grid transformer, even a small output to speaker transformer will do. I mounted the transformer with small machine screws—even an adhesive or potting compound may be tried. The ear piece may be wrapped at the edge to fit tightly and stuffing placed so that it is held securely against the cover. The cover required several holes and two small pieces of window screening so the voice might enter freely and the unit held in place.



Fig. 3.

Left: Mike using ANB-V-1. Centre: ANB-H-1 ear piece. Right: Mike using new unit.

Place a grommet in the microphone cable hole to protect the lead wire. I didn't bother to paint the cans as I demonstrate their ruggedness by driving tacks with the completed mike—wonder if many of the crystal units would take that abuse? See Fig. 2 for the finished mikes.

The mike with the telephone handset has much more gain. It is wonderful to have such a rugged mike in the shack or for mobile use, as it is almost completely waterproof and shock-proof.

## THE MINIWIHP

(Continued from Page 3)

an Antennascope to bring the base impedance of the combination to the 25-ohm figure.

My thanks go to Joe Reed, VK2JR, for theoretical and practical help in this project, because without a doubt, the success of multi-band Helicals is tied to the correct matching of their base impedances and without Joe's help in the balun department, this venture would not have been successful.



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of Mick's 432 Mc. transmission from Dunblough has increased his ego to make it a two-way contact.

Activity on 576 Mc. is skyrocketing to mammoth proportions with over 12 stations very active on the band. All equipment is of the unstable variety and efforts are being concentrated on extending the VK3 record of approximately 100 miles. A recent contact of 86 miles between Rick SZEP/P and Trevor SZTM/P to John SZJH/P at 89 signal strength does more than make up for a new 576 Mc. record that is imminent. 72, BZJH. (Many thanks for stepping into the breach, Colin. Keep up the good work. SZGP.)

#### WESTERN AUSTRALIA

The new year came in with a heat wave which caused all radio sets operating on 83 Mc. to become inoperative. It was a relief to us when the other guys were working these ZLs. This was on Dec. 31 when everybody except me worked three ZLs each. It was a hard job working DX and it was necessary to listen continuously and work the station which came up for a few minutes.

On 8th Jan. Andrew EZCN worked SZLJ, BHB, or about 120 miles. He was very happy. He heard the VK3 beacon on 144.8 Mc. while tuning the band, called on 8 and contacted SZJH immediately. They arranged for the latter to call on 8 and he copied 83 and 85. Then both stations went on 3 and exchanged numbers. The last such contact was 12 years ago.

Andrew leads the Ross Hill Contest over here with 380 points. EZDS has 300 points and 6LK leads.

David EZK and Dave EZAX were over here from 10/1/58, running 100w, mobile, 1L, OM.

Greetings to newcomers Max EZFM in Wembley and Bill EZBB in Midland. Max has an 818 and Bill a 540 with an evanescent rock on 82.418.

Heard WUKBH from Minnesota at the last Morse exam, complaining that the Australian exam was "a bit stiffer than the American." Carol will be on 10 m x 5. All will see well, otherwise he will apply for a Z call.

The Xmas fox hunt was an easy one as even I managed to find the tx despite the registration. The EZDS had devised the fox hunt party at Lance's home in Wembley was good fun and lasted well into the morning. Lance may be going on some sort of hunt again. He is taking up tennis in Moore. Good luck! 72, EZAG.

#### SIX METRE A.M. NET

With the adoption of 53.538 Mc. as the 6 m. a.m. net by the Iperwich Group and the possibility of Brisbane also using the frequency, the popularity is growing in leaps and bounds. With both local and DX use, operation becomes rather difficult at times and it is suggested that all users adopt some procedure to permit full use of the frequency, both as a cross-town, mobile and DX channel.

Firstly, keep your calls and overs short! A long CQ is not necessary. If you don't succeed the first time, wait again but don't keep calling CQ for long periods.

Observe a break of 3-5 seconds before replying to allow another station to call. You can never tell who is listening. VK3 1, 5, 6, F and G have been heard from Melbourne. Keep your ears open. Reports indicate that signals from VK3 were heard in VK3 right through the night. If the results are as good as a large, adopt the procedure of having a break for the first minute in each fifteen minutes. Stations wishing to call it should use this period. Identify themselves.

It is quite feasible for groups located remote from each other to use the net at the same time without mutual interference. However, stations operating from the same locality using high power should be wary of causing QRM to others.

Each week VK3WL uses the frequency for the 8 day period between 1800 hours and 1900 hours. This provides a steady strong signal over a large area for receiver alignment. Immediately after a call back is taken, and the opportunity can be taken to introduce yourself to other net users. The net is available to anyone who cares to call on the frequency. Whether you are crystal or v.h.f. makes no difference. Try to not use the frequency for the purpose of adjusting your antennae with long periods of unmodulated carrier, etc. This only causes inconvenience to all the other users and is not becoming of an Amateur.

Lastly, check your frequency; services are available. There are a number of stations with facilities for frequency checking. Many stations are using crystal-locked rx's and if you are more than a few hundred cycles off frequency you are not likely to be heard.

Many use tuneable rx's however and will hear you.

Soon we will be organizing activity days on the net for mobiles, etc. Listen to the broadcasts for this information and endeavor to appear during the times requested. It may be to your advantage. Shortly a register will be commenced to log all stations appearing on the net for a "whome" for who is most interested. See you on the net, 73, SZGP.



### V.H.F. DISTANCE CONTACTS

Following is the latest copy of this complete list of V.h.f. Contacts held on file. This includes all contacts known to me up till the end of 1966.

—David Rankin, VK3QV,  
Federal Activities Manager.

60 Mc. BAND		
Call Signs	Date	Distance
VK3ALZ-ZX1PU	1/5/58	8419 Miles
VK3IAZ-VETAAQ	8/4/58	7230 "
VK3XZA-QJABY	20/3/58	3060 "
(now VK3QV)		
VK3ALZ-VK3QV/KH3	19/4/58	8400 "
VK3BE-JASBP	30/10/58	5400 "
VK3ZAL-J-JARJW	14/4/60	5400 "
VK3ZAL-J-KARJW	14/4/60	5400 "
VK3ZAL-J-JACCC	14/4/60	5400 "
VK3ZAL-JAILL	3/12/58	5400 "
VK3ABR-JABP	25/2/58	5300 "
VK3ZAL-JABP	25/2/58	5300 "
VK3KL-WTACB/KH3	26/3/47	5200 "
(Darwin)		
VK3AZ-ZK3RG	16/3/58	5200 "
VK4HD-W6N1Z	29/3/58	5000 "
VK4HD-W8PUZ	13/3/58	4800 "
VK3RU-JA1ANO	1/4/58	4800 "
VK4HD-JA1UK	1/4/58	4800 "
VK3AU-KH3BY	30/4/60	4312 "
VK3AU-KH3GP/KH3	30/4/60	4281 "
VK3AU-JA1AH5	22/1/58	4196 "
VK4HD-KH3BY	22/1/58	4196 "
VK3RK-VJ3CQ	31/3/58	3660 "
VK3WG-VJ3CQ	31/3/58	3618 "
VK4AU-KH3AB	27/8/58	3618 "
VK3ZBE-VJ3CQ	8/4/58	3618 "
VK3AU-JA17H	30/4/60	3252 "
VK3ZBE-SM3DQ	19/4/58	2883 "
VK3BE-VJ3CQ	26/3/58	2883 "
VK3ZAL-SM3DQ	30/3/58	2845 "
VK3ZB-ZL55G	26/12/58	2008 "
VK4HD-VJ3CQ	26/12/58	2008 "
VK3AU-VJ3CQ	14/12/58	2008 "
VK3IM-VJ3CQ	20/12/58	2008 "
VK3AU-VJ3CQ	1/1/58	1850 "
VK3ZB-ZL55G	26/12/58	1850 "
VK3ZB-ZL55G	16/3/58	1238 "
* A.I.		

144 Mc. BAND		
Call Signs	Date	Distance
VK3ZFP-ZL1ADE	24/12/58	1961 "
VK3ZFP-ZL1AUM	24/12/58	1961 "
VK3ZFP-ZL1AQA	31/12/61	1342 "
VK3ZFP-VK3BQ	30/12/61	1323 "
VK3AU-VK3BQ	9/3/63	1311 "
VK3ZAL-ZL1AR	15/12/61	1307 "
VK3ZAL-VK3ZAX	15/12/61	1197 "
VK3ZAL-VK3ZAX	15/12/61	1080 "
VK3ZAL-VK3ZAX	27/12/61	1040 "
VK3ZAL-VK3ZAX	30/12/62	1040 "
VK3ZAL-VK3ZAX	27/12/61	804 "
VK3ZAL-VK3ZAX	27/12/61	804 "
VK3ZAL-VK3ZAX	27/12/61	804 "
VK3ZAL-VK3ZAX	27/12/61	709 "
(now VK3ZPB)		
VK3ZB-VK3ZL	29/4/58	800 "
VK3ZAL-VK3ZL	18/1/58	800 "
(now VK3ZRX)		
VK3ZB-VK3ZL	29/4/58	871 "
VK3ZB-VK3ZL	29/4/58	871 "
VK3ZB-VK3ZL	29/4/58	871 "
VK3ZB-VK3ZL	29/4/58	871 "

430 Mc. BAND		
Call Signs	Date	Distance
VK3ZAX-VK3AW	13/11/64	226.6 Miles
VK3ZB-VK3ZAX	13/11/64	119.7 "
VK3ZB-VK3ZAX	13/11/64	97.3 "

578 Mc. BAND		
Call Signs	Date	Distance
VK3LX-VK3ZB	15/12/63	101.3 Miles
VK3AN-VK3ZB	11/12/60	80.1 "

1118 Mc. BAND		
Call Signs	Date	Distance
VK3ZAC-VK3ZC/1	4/2/63	49.3 Miles
VK3LA-VK3ZC/3	4/1/63	1.0 "

2280 Mc. BAND		
Call Signs	Date	Distance
VK3ZAX-VK3AN	15/1/58	9.0 Miles

2280 Mc. BAND		
Call Signs	Date	Distance
VK3ZC/ZG/3	14/12/63	63.5 Miles
VK3ZC/ZG/3	14/12/63	63.5 Miles

## YOUTH RADIO CLUBS

First mention for this month should go to VK3. Neil 3AVK quite rightly mentions that this column does not give much detail for VK3 activity as for VK3. There is a reason, of course—I get more letters and details from VK3, even though the excellent Newsletter sent by Ken Matchett. In 1964, I was considered unimportant in other Divisions—and who am I to argue? I have better hopes for VK3. Anyhow, Neil mentions that young A.O.C.P.s that he knows. Rodney 3A1L is active on 80-40 20-3 mhz with 35w, on home-made, will be doing the Main School of Science College, passed A.O.C.P. before 18. Peter 3A2L obtained A.O.C.P. at 15, has been active on 80 with 15w., has nearly finished a 5.5 Mc. filter, will be doing the Main School of Science. 3ZCR is active on 2 mhz and is pushing away at c.w., aged 18. Neil 3AVK is on 80-40 with 25w., a high power linear, nearly ready for a.b., is 18 and does Matric this year at Carey Grammar. Let's hope there are more like this year.

Here are some excellent results in the N.S.W. Leaving Certificate from four well known young Amateurs. Susan Brown 1B3B (Booragul) obtained two Honours in Law and two B's. Joseph Mac 2Z3H (King's School) obtained two Honours, two A's and two B's. Roger Davis 1J3D (Lyneham) obtained three A's and two B's. Jim 1J3D (Lyneham) obtained three A's and two B's. All four are now in the first year of a one Honour, four A's and a B. All four were given Commonwealth Scholarships. There are more names from this month (all Divisions) please note. Ken 1J3D, Henderson, Head of the Physics Department at Sydney Teachers' College, has made a special point of advising his students about advantages and possibilities of the Y.R.S. It is probable that a transmitting club will be established at the Teachers' College this year. Teacher transfer to other schools is a possibility. Head of Amateur Radio a wonderful thing when sent out to lonely one-teacher schools. There is no doubt the Y.R.S. is a prime target for the Division resources.

Some other news from VK3—Bill Allen, leader of Gwyne Park State School Y.R.C. spent 10 weeks in Heidelberg Repat. Hospital, but is now out and enjoying a holiday before going back to work. Alan Levery, Instructor at Christian Bros. (Bundoora) has gained A.O.C.P. and the club should be on the air (3ZFR) on 2 mhz by now, with the assistance of Dave 3ZMX.

Loads of news in VK3: Continued interest in Keith 1A3K's Electronics by Radio on 160 mhz. Nick 1J3D's "King's School" Y.R.C. is a human trainee at Western Electrics at Sydenham. Transfers noted are Mr. J. Standard (1B3B) from Kingsgrove North to Epping, Roger Standard from Inverell to (help urgently needed at Inverell High), Jan Oostervren, 1B3D (Westlake), has finished P.M.G. trainee technicians school and will be transferred to Singleton Exchange. Malind Y.M.C.A. considering radio amongst protected activities and help wanted from Amateurs. Peter 1J3D, Christian Bros. (Bundoora) is an Electronics Helper at a camp for school-boys with loads of parts and plenty of projects—an interesting one and would like to see other Y.R.C.s. Flight Instructor Terry Crowe (R.A.A.F.), formerly of Gosford High, has had two promotions during 1964 in the Radio Apprentices' Course at RAAF. Peter 1J3D selected for a four-year Signals Officers' Course—a great effort!

John Thord (Kingsgrove North) is now a Teacher in Dept. of Civil Aviation in a five-year course on latest equipment. More negotiations for liaison with Bays Bridge, and the Air Force. Col. 1J3D, and other activities wanted by Rex 1J3A. Lastly, a little from VK1: David Davies, 1DD, now on the air with a transmitter from Lyneham but soon to have his own. David Davies, 1DD, and a lot of the hard work for I.A.C.A. 73, 1KM.

#### ERRATA

Readers are asked to note the following corrections to the article "Modifying F.M. Carphones," Dec. 1964 "A.R.U." p.3. Fig. 1, lower drawing: The "6AU6" plate tuned circuit capacitor should be transposed with 40 Mc. double grid component. Fig. 2: The three crystal sockets on the left should be marked "Rec." and the three on the right should be marked "Tx".

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# NEW CALL SIGNS

NOVEMBER, 1964

- VK2BS—J. W. Starnard, 66 Shadforth St., Moesman.  
VK3QJ—V. N. Tuohill, Tanjil Gr., Lakes Entrance.  
VK3ACW—R. R. Hake, 948 High St., East Prahran.  
VK3APN—P. R. Nesbit, 32 The Grange, East Malvern.  
VK3ASK—C. Sterling, 3 Bloomfield Ave., Meribyrnong.  
VK3ZDV—D. W. Wright, 222 Springfield Rd., Nunawading.  
VK3ZKP—W. H. Kelly, 58 Finn St., Bendigo.  
VK3ZEV—A. P. Telford, 292 Riverdale Rd., Camberwell.  
VK3ZEY—J. C. Meyland, 3 Gayer Ave., Warrigatta.  
VK3ZVD—N. G. Chalmers, 7 Balmoral St., Essendon.  
VK3ZKK—T. D. Lamb, 7 Rosebank Ave., Strathmore.  
VK3ZND—N. W. Deague, 26 Somers Ave., Malvern.  
VK3ZPN—N. J. Watson, 85 McNamara Ave., Niddrie.  
VK3ZPW—P. J. Wright, 16 Louise St., East Brighton.  
VK3ZTL—T. L. Lindsay, Station: Lot 187 Dunlop Ave., Norlane; Postal: Radio Station, 1 B.F.T.S., Point Cook.  
VK4ET—E. T. Pendleton, 38 Chertwell St., Aspley.  
VK4ZZO—G. D. Nixon, St. Patrick's Ave., Kuraia.  
VK5HH—M. K. Rogers, 30 Portland Ave., Darrington.  
VK5ZDE—D. B. Murdoch, 32a King St., Miffie End.  
VK5FL—F. G. Lambert, 83 Second Ave., Humeville.

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# FEDERAL AND DIVISIONAL MONTHLY NEWS REPORTS

(SEND CORRESPONDENCE DIRECT TO DIVISIONAL REPORTER NAMED AT PARA. ENDS)

## FEDERAL QSL BUREAU

Congrats. to John VK5KO on his further DX on 190. Latest additions are JASAK and 8L3Z.

Cards from ex VK5KB have recently come through for his Antarctic work during 1960!

Ken VK5TI, recently on a DX-pedition to Norfolk Island signing VK5TI, pulled up QSLs in business-like manner, both on c.w. and s.b. The Galaxy outfit worked fine. QSLs to Ken either at home QTH or via this Bureau.

Bob VK5RB completed his tour of duty at Norfolk Island during January and returns home to G. land. All QSLs should now go via R.S.G.B.

George CR5GO, QSL Manager for Angola, expresses his desire to help any station who has outstanding QSLs from CRA. Contact him at Box 404, Luanda, Angola.

VERONA A. (Netherlands Antilles Section of I.A.R.U.) advice of their new Curacao Certificate. Full details from this Bureau.

Ray Jones, VK5RJ, Manager.

## NORTH SOUTH WALES

### SUNTER BRANCH

"There was nothing ugly about that duckling!" This was the remark made by one of the thirty members, associates and visitors who attended the Sunter Branch meeting. The Branch held at the Technical College on Friday 8th. The reason for the remark was the description and demonstration of a beautifully built sideband transceiver made by Alex 2Z. Old gentlemen on the 80 mhz band are sometimes hard to refer to certain commercial equipment as ugly ducklings and the title which has come into general use. Alex is to be complimented on the standard of workmanship in the unit, which he says is nearly as good as the one he has described with the aid of block diagrams and circuit sections how the transceiver worked and how it was made. Alex's unit was a valve could be made to provide several functions by blasing. Several of the members who are conversant with the mysteries of the fernyard made pithy remarks and questions, following the lecture, one of the old gentlemen aforementioned, Lionel 3CB, moved a vote of thanks which was carried by hearty acclamation. I was unable to get a close look at the gear because of the large gathering of bodes already round the demonstration table. However, what was carried by me and this was an excellent project, construction and operation wise.

Although the attendance book was passed around the room, some of those present failed to sign it. If it is impossible for you to write your name then make a mark of some kind to record your presence.

There are several theories as to why we did not have the company of the President, Frank 3APO. One very uncomplicated type said that he had forgotten the meeting, but I favour the second reason—he was mending the holes in his net. Some of them are really quite large, being as large as his head. I wonder if you don't know of whom I speak? Rodney 3CN is the lucky holder of the title since the last barndance.

Stan 3AYL threatened to keep all the QSL cards he had for me if I made any more errors in his call sign in those notes. Having lowered myself to the level of a card collector, Stan brought my huge bundle of cards from behind his back—three all told and two of them were for me. Stan is a very good fellow, his fowl all died still. It does prove that I am on the air at times and that I am considered illustrious enough to have my call letters printed. Stan 3AYL was most interested in the ducktalker and perhaps this indicates an early change from a.m. Being no prophet, I am unable to predict the future, but I can promise that by the time you read this, Chris will have some publicity—complete with pictures of the QSLs. The Commodore Radio Club will also be the Newcastle

Harold will join me in congratulating Jennifer Cox, the President's daughter, for the really excellent job she is doing in publishing Amateur Radio in this area. I am informed that the Saturday column is more extensive than that in any other Australian newspaper and that circulation throughout the country and along the coast ensures that the news of Amateurs goes into more homes than elsewhere in the country. And think of the handsome, intelligent, eligible young men who have featured in the photographs! (Just address your letters to my call book address please fans.)

Returning briefly to earth, I have to report that our old friend Bob 3AQR, who is known to some of his more coarse associates as Sir Cumference, has defected to the Central Coast, and, worse still, up to the time of writing, he hasn't even turned the key over. Things must be pretty busy among the apothecaries of East Gosford. Bob had hoped to record his 500th contact with Bill 4Z who, on the left, but they just could not make it. Bill is not giving up hope though and he is looking forward to regular lunch-time QSOs as soon as things are back to normal. He tells me that his new diet is most successful and that I should try it. Of course the truth is in his hands. I have heard that he has been in him cutting down to four meals a day. It is to be hoped that by this normal meal times will again prevail at Phoeny Bay.

Some of the Westlake boys put on a field station for the John Womersley Memorial Field Day, but what success they had is not reported. They are grateful to all who helped, especially Bill 4Z who loaned some very compact 3 mhz gear. The same Bill has been leading a leisurely existence of late at his country retreat by the beautiful lake and was during this time that he heard of the proposed field activity. If you have any old lawnmowers about, please contact Stuart 3AYF who has some electronic equipment which he is generating the currents necessary for field operation.

With the State elections soon to be upon us, maybe you would like to get some backslapping practice. If so, please be in attendance at the usual place, Room 6, Clerg Building, Newcastle Technical College, on Saturday 17th March, 3 p.m. Reason, it is the Annual General Meeting of the Branch and the time for new officers. Please try to be there. For one thing democracy must be satisfied, and for another all the other blokes will be there, so why not you? See you, 73, 3AKK.

## QUEENSLAND

### DIVISIONAL COUNCIL MEETS

The monthly Council meeting was held at the Institute of Social Sciences, Berwick St., Valley, Brisbane, on 15/1/65. E. M. Peter 6VJ (President of the Division) was in the chair. The Council meeting was well attended and a few visiting members were also present.

Correspondence was read and adopted and then it was brought to the notice of the meeting that Alan 3AQA, a member of the Council, has decided to relinquish this position since he was about to undertake extensive motoring tours with his XYL.

Seven new applications for membership were approved by Council and names will be submitted to the next general meeting for ratification.

Federal Councillor Laurie 4ZGL reported that a motion was to hand from VK2 to the effect that "As the minutes from the 1964 Convention have not yet come to hand, the VK2 Division put forward a motion that the 1965 Federal Convention not be held." The VK4 Council voted against this motion as it contends that the 1965 Convention should be proceeded with.

## SILENT KEY

It is with deep regret that we record the passing of—

VK3ZD—Ron Williams.  
VK5DA—S. R. Buckenfield.  
Ex-VK6JJ—J. T. Jewell.

The Treasurer's report was read and adopted. The Treasurer 4DG tendered his resignation from the position and has been tendered by Don 4DZ. The President, while accepting Keith's resignation, stated that he had done a very good job and due to his efforts, the financial position of the Institute had never been stronger.

Don 4DZ has also been appointed organiser for the Sunshine State Contest. He has formulated a series of proposals for improving the Contest. These proposals will be published in "QTC". It is suggested that comments will be invited from all members before these proposals are adopted.

The W.I.C.E.M. movement has been very slow. Some entries have been received from the country, but Brisbane members seem to be very reluctant to accept services.

It was moved by AL 4LT that Council accept the recommendation of the sub-committee that it purchase a Galaxy 3 s.b. transceiver for 4WT. The motion was carried. (Not to be read by SP5I)

The question of the setting of papers for the Youth Radio Scheme and also the marking of a causing action was discussed. Some discussion took place on this matter. Most of this stemmed from the points raised by Frank 4WJ at the January general meeting—quite a meeting, wasn't it, Frank?

Jack 4JF, the VK4 QSL Officer, reports that VK3 VK3 and JA QSL Bureaus are returning quite a few cards since the owners are no longer members or do not bother to collect their cards.

Finally congratulations to the Ipswich Radio Club. The official station of the Club, VK4IO, was handed recently by the Patron of the Club, the local M.R.R. The Club Station opened with a contact with VK4WI during the Sunday morning news broadcast. 73, BU 4ZBD.

## TOWNVILLE AND DISTRICT

Since writing the last note, I have not received much in the way of news, so I must not resort to padding, which is the sole prerogative of that much maligned scribe and foe of our weekly Editor.

Basil 4ZW called in on his way back from the capital city, proud possessor of a new car of which he tried vainly to make me jealous (and how). Swears that Zee was his poor navigator, yet she found my new QTH at 15 Chubb St., Belgium Gardens, Townsville.

Charlie 4BQ also had a pleasant trip over the north and as far south as Bundaberg. No doubt to taste its famous rum!

Met 4WH the other day in the city after a long time and Eddie has seemed to forsaken Radio in favour of the corner places, which he has been visiting and evaluating. He reaches high enough that he can retire.

As I have moved to this new QTH and have no skyline at present, am unable to glean any news by eavesdropping. So all my friends have patience a little longer and make good use of the quietness, as I can bush your ears again.

Ernie 4LAK and his wife were welcome visitors after quite a long time. He has other hobbies that bites into the time.

Bert 4LB is pleased that the new quad is back again in position and higher than before. He has also been busy drumming up my tower together with Merv 4ZMD. Hope it is not long before I have it up, then will compete with the 4SPS. I have been busy with the 4SPS from me, while we both look down on Ken 4KT on the lower reaches—he being in a more favourable position for DXing.

Perhaps my memory is failing, but I have a recollection that the 4SPS is hanging on my Cuppa was back in 1959, when Gordon 4KU took me along to the Council meeting at 4SPS. I will remember that date because I was being sent back into the city, after he had received strict instructions that I be accompanied with the free lodgings at taxpayers' expense.

Frank 4JF was met the other day and says that he has not been active for quite a while. His co-partner, Bob 4MF, is quite active with the 4SPS. I will remember that date because I was sent back into the city, after he had received strict instructions that I be accompanied with the free lodgings at taxpayers' expense.

## RONALD ARMAND WILLIAMS, VK22

Born 11th December, 1918, educated at Trinity Grammar (Melbourne) and an early member of the Wireless Institute of Australia, Ron was a true Ham with the ardent curiosity to know not only "how something worked" but "why it worked", and this tenacity of purpose stayed with him right throughout his commercial career.

At the conclusion of hostilities an opportunity came for him to move into the field of broadcasting and he (now with his wife and family) moved to Warragul where he worked for 12½ years as Manager and Chief Engineer of SUL, one of the country stations of the Associated Broadcasting Services network.

With television appearing on the horizon Ron found time to study television technique and programming for which he attended the Royal Melbourne Institute of Technology, travelling from Warragul to Melbourne several times a week to attend night classes. When the opportunity presented itself he applied for, and obtained, the General Managership of QMVS Television in Shepparton and from that time the commencement of foundation was the commencement of the foundation. He supervised the entire installation until its inaugural opening and for the three years of its existence until his untimely passing.

It is worthy of note that engineers, technicians, electricians, programme staff and all other sections of the broadcasting

SIDNEY ROY BUCKERFIELD, VKSDA

Licensed in 1924, he was an active Amateur up to the time of his death, and during his long association with radio he was connected with the building and installation of RCA's first transmitter, and as a technician with the P.M.C.'s Department of Radio, with the installation of the SAN transmitter in the old Central Exchange Building, and also with the installation of 5DR at Darwin. He was, for a time, Officer-in-Charge at Crystal Brook with 5CKK, and later assisted with the early experiments associated with the station at Mount Bonython, from whence he retired under medical advice in 1962.

One of the few remaining real "old-timers," his sudden passing leaves a gap in the history of Amateur Radio in VKS which cannot be filled, and to his sorrowing wife, Selma, his son, Graham, and his two daughters, Anita and Joan, the VKS Division extends its deepest sympathy and can only hope that time will ease the burden of his departure.

Until the war, Jack was active as VK-6JJ in the Amateur sphere and was a foundation member of the Subiaco Radio Society. Up to the time of his death he was Radio Superintendent for 2½ years. For several years he was Chairman of the Amateur Advisory Committee. Being an Amateur, he was sympathetic to their requests and at the same time looked after the interests of the Department.

Jack leaves a widow, a married daughter and a son, and our sincere sympathy goes out to them.

the meeting moved in a somewhat spectacular manner with a lot of running hither and thither, mostly thither, by the President (Phil SNN), with the lecturer for the night, and/or his assistants at times trying to get into the act. The reason for the hither and thither business was finally established as being caused by the absence of the caretaker and the inability to locate certain pieces of equipment necessary for the lecture, but as our President usually gets his man in the end, I don't know which way the meeting eventually settled down to normal.

The lecturer for the night was Dr. Briggs, from the University of Adelaide, who discussed at length all aspects of the ionosphere and its many points raised by Dr. Briggs was one to the effect that St. Kilda is a reasonably quiet area and that the proposed cable route is considering a proposal to erect about 100 dipoles at Buckland Park, several over about 100 miles apart. The dipoles will be connected to 100 transistor receivers by a system of some 50 miles of co-ax. cable. The lot to be used is a fairly level area, but the wind velocity in higher altitudes and measure wind velocity. If you should bump into me walking down one of our main streets with a transistor receiver, I would be able to tell you that it is a good year move, then you can safely deduce that I have been dallying in the vicinity of Buck-

The lecturer answered questions as he went along and the members who did the asking certainly seemed to be well on the ball so far as the subject matter was concerned, whilst the non-question asking members never seemed to get their minds off the fact of so many instructor receivers lying around not earning their keep. It was the last time that the lecturer was ably proposed by Rob ARG and the applause which followed definitely indicated how successful the lecture had been.

Very little business of importance was transacted, there was some discussion on frequencies for WICEN, in the 53 Mc. region, but it was thought that the general meeting was hardly the place to deal with this; the President drew attention to an article recently printed in "CQ" re the I.T.U. Convention at Geneva, which he considered highly informative and he will seek its reprint in the magazine for general reading; and last, but by no means least, some items available, and some hoped-for, were mentioned.

the audience, so members were on standby. When the time came, the members by and large were new to the group, although one member, whom was GSKEL who is residing at present anyway, at Windsor Gardens QRM for Dave SDS—or is it vive-voce, who was brought along by Jack SIS, also Messrs. C. Leonard and H. Graham. A little more hither and thither business brought the meeting to a close, and members left for their couches of virtue, most of them anyway, while I went home to write up my report. Well, thanks go to my new cub reporter, Tom STL, who helped me out by covering the meeting. What's that? He is no cub, oh get away with you, we are only as old as we feel. Look at those eyes! They're bright like turquoise, and other expressions of baby, tell ill!

Rad quite a job digging up some information on Buck SDA for his obituary. As is usual with the average Amateur, Buck had no idea of the significance of the name in his hobby but no official records had ever been written down, and whilst most of the radio community would know of his career in radio nobody could pinpoint anything in particular. During the digging process I found out that Buck was not just how many of the "Big Brass" in the P.M.G. were on christian names basis with their radio friends. I also found out that I had worked alongside most of them back in the old days when they were just simple radio amateurs. I was a little disappointed that although they were in big stations, they still retained their sense of humour and their sense of fun. I was a Radio Superintendent, retired State Engineer, and one struck one who was inclined to work on the radio and work with him down on telephone construction.

After I had a chance to see him again I was glad to see him. He addressed him as "Boofhead" and drew his stationer's hat over his eyes. He was a good deal of incidents that occurred out on the job, with him and I as the guilty culprits. We finished

I received a lot of letters and cards over the Festive Season, for which goes my sincere thanks. It was good to know that I had more than just the one reader I had hopefully

## RONALD ARMAND WILLIAMS, VK22

Born 11th December, 1918, educated at Trinity Grammar (Melbourne) and an early member of the Wireless Institute of Australia, Ron was a true Ham with the ardent curiosity to know not only "how something worked" but "why it worked", and this tenacity of purpose stayed with him right throughout his commercial career.

At the conclusion of hostilities an opportunity came for him to move into the field of broadcasting and he (now with his wife and family) moved to Warragul where he worked for 12½ years as Manager and Chief Engineer of SUL, one of the country stations of the Associated Broadcasting Services network.

With television appearing on the horizon Ron found time to study television technique and programming for which he attended the Royal Melbourne Institute of Technology, travelling from Warragul to Melbourne several times a week to attend night classes. When the opportunity presented itself he applied for, and obtained, the General Managership of QMVS Television in Shepparton and from that time the commencement of foundation was the commencement of the foundation. He supervised the entire installation until its inaugural opening and for the three years of its existence until his untimely passing.

It is worthy of note that engineers, technicians, electricians, programme staff and all other sections of the broadcasting

SIDNEY ROY BUCKERFIELD, VKSDA

Licensed in 1924, he was an active Amateur up to the time of his death, and during his long association with radio he was connected with the building and installation of RCA's first transmitter, and as a technician with the P.M.C.'s Department of Radio, with the installation of the SAN transmitter in the old Central Exchange Building, and also with the installation of 5DR at Darwin. He was, for a time, Officer-in-Charge at Crystal Brook with 5CKK, and later assisted with the early experiments associated with the station at Mount Bonython, from whence he retired under medical advice in 1962.

One of the few remaining real "old-timers," his sudden passing leaves a gap in the history of Amateur Radio in VKS which cannot be filled, and to his sorrowing wife, Selma, his son, Graham, and his two daughters, Anita and Joan, the VKS Division extends its deepest sympathy and can only hope that time will ease the burden of his departure.

Until the war, Jack was active as VK-6JJ in the Amateur sphere and was a foundation member of the Subiaco Radio Society. Up to the time of his death he was Radio Superintendent for 2½ years. For several years he was Chairman of the Amateur Advisory Committee. Being an Amateur, he was sympathetic to their requests and at the same time looked after the interests of the Department.

Jack leaves a widow, a married daughter and a son, and our sincere sympathy goes out to them.

the meeting moved in a somewhat spectacular manner with a lot of running hither and thither, mostly thither, by the President (Phil SNN), with the lecturer for the night, and/or his assistants at times trying to get into the act. The reason for the hither and thither business was finally established as being caused by the absence of the caretaker and the inability to locate certain pieces of equipment necessary for the lecture, but as our President usually gets his man in the end, I don't know which way the meeting eventually settled down to normal.

The lecturer for the night was Dr. Briggs, from the University of Adelaide, who discussed at length all aspects of the ionosphere and its many points raised by Dr. Briggs was one to the effect that St. Kilda is a reasonably quiet area and that the proposed cable route is considering a proposal to erect about 100 dipoles at Buckland Park, several over about 100 miles apart. The dipoles will be connected to 100 transistor receivers by a system of some 50 miles of co-ax. cable. The lot to be used is a fairly level area, but the wind velocity in higher altitudes and measure wind velocity. If you should bump into me walking down one of our main streets with a transistor receiver, I would be able to tell you that it is a good year move, then you can safely deduce that I have been dallying in the vicinity of Buck-

The lecturer answered questions as he went along and the members who did the asking certainly seemed to be well on the ball so far as the subject matter was concerned, whilst the non-question asking members never seemed to get their minds off the fact of so many instructor receivers lying around not earning their keep. It was the last time that the lecturer was ably proposed by Rob ARG and the applause which followed definitely indicated how successful the lecture had been.

Very little business of importance was transacted, there was some discussion on frequencies for WICEN, in the 53 Mc. region, but it was thought that the general meeting was hardly the place to deal with this; the President drew attention to an article recently printed in "CQ" re the I.T.U. Convention at Geneva, which he considered highly informative and he will seek its reprint in the magazine for general reading; and last, but by no means least, some items available, and some hoped-for, were mentioned.

the audience, so members were on standby. When the time came, the members by and large were new to the group, although one member, whom was GSKEL who is residing at present anyway, at Windsor Gardens QRM for Dave SDS—or is it vive-voce, who was brought along by Jack SIS, also Messrs. C. Leonard and H. Graham. A little more hither and thither business brought the meeting to a close, and members left for their couches of virtue, most of them anyway, while I went to my night's rest. Well, folks, thanks go to my new cub reporter, Tom STL, who helped me out by covering the meeting. What's that? He is no cub, oh get away with you, we are only as old as we feel. Look at those pictures! They're beautiful, purple, and other expressions of baby, tell ill!

Rad quite a job digging up some information on Buck SDA for his obituary. As is usual with the average Amateur, Buck had no idea of the significance of the name in his hobby but no official records had ever been written down, and whilst most of the radio community would know of his career in radio nobody could pinpoint anything in particular. During the digging process I found out that Buck was not just how many of the "Big Brass" in the P.M.G. were on christian names basis with their radio friends. I also found out that I had worked alongside most of them back in the old days when they were just simple radio amateurs. I was a little disappointed that although they were in big stations, they still retained their sense of humour and their sense of fun. I was a Radio Superintendent, retired State Engineer, and one struck one who was inclined to work on the radio and work with him down on telephone construction.

After I had a chance to see him again I was glad to see him. He addressed him as "Boofhead" and drew his stationer's hat over his eyes. He was a good deal of incidents that occurred out on the job, with him and I as the guilty culprits. We finished

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The Division could be losing the services of Alvin GZDM, our Secretary, as he has been posted away to another State, but has managed to get a three-month stay of proceedings. Should he have to go then we will require a volunteer to take over the Secretary's job. If you are at all interested then how about letting your Council know.

SWL's transmitter has now been shifted from Kalumanda and is now being housed in Nedlands.

Here I think that we should one and all make the many people who make our news broadcasts a success. Not only do we have the one person involved, but several other relay links in operation. These relay teams help out in the running of the news broadcasts and make things so much easier for Mac GDM. Well this seems to be all for this month, so see if you can give me more information for our next notes. Remember, you can let me have them right up to the second of the month. You had better start thinking about another scribe also as I have given a date after which I will not submit any notes for publication. 13, May 63K.

## TASMANIA

Here we are into the third month of the year already, which means sub. month and Annual Meeting, and Dinner month as well, so make it a good roll up this year; the date is 27th March. The Venue for the meeting will be the club rooms at 147 Liverpool Street, Hobart, while the Dinner will be held at the S.W.A. Rooms in Criterion Hotel. Cost will be £6 per head, so make up a car load and let's have a real get-together.

Last November (that's a long time ago so it seems) we had a visit from George ZLGO and his XYL Joan, who toured the State on their station sedan and visited quite a large majority of shacks in VKY.

Ian ZLQ reciprocated in early January by spending a very pleasant day at George's place at Wacol, VKA, while he was in that fair boat with his cricket team.

Our February lecture, following the general meeting, was given by Mr. Rod Sutherland, the

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title of which was "The Application of Electronics in Heart Research." This was without a doubt an exceptional lecture, by a gentleman who has considerably more than a layman's knowledge on the subject and he is to give us a further talk on the subject and I would advise all those who can make it to come along "cos it's sure a fascinating subject".

The Institute once again provided radio communication between starter and judge for the swimmer held in aid of the Royal Hobart Regatta—the largest aquatic carnival in the southern hemisphere, and our thanks to the volunteers who operated the equipment on the two days.

After a lapse of some considerable time, W.I.C.E.R. has got going again in VKY and an exercise held in aid of Jamboree 16 stations on the air. We learnt where our faults were (and still are at time of writing), but still we consider it highly successful.

Mid January also saw a breakthrough to VKA from VKY. GZWB being the Queenslanders concerned and if my memory serves me right, the VKY stations who worked him were Col TLE from Launceston, John ZLJG and WHZ TZAQ from Hobart.

Sorry there's not more chaps (the Ed. will be pleased), but pressure built from business and the home front is keeping me pretty busy at the moment.

Don't forget subs. are due on 1st March. Don't let us have a reputation of previous years, ask everyone you see has he paid his yet, and we might get them in a bit quicker (perhaps). 13, May 63K.

## NORTHERN ZONE

Firstly, I must apologise for the lack of notes over the last few months. Nothing very startling has been happening but I will try to outline the happenings in the Zone now.

Firstly, in the 20 MHz band, Mike ZLQ and the only constant activity here, and has, since the last lot of notes, acquired an a.s.b. transceiver which puts out a very nice signal. Using it mainly on 20 MHz, Don has worked a surprising amount of DX.

Occasionally a few other stations pop up on these bands, but since Don has left our ranks, only TDK supplies constant activity.

Going higher in frequency, 22 Mc. was reasonably well populated during the Contest. A newcomer to this band was Mike ZLQ, of course all the old regulars turned up to work their share of stations. This band was not as good as the 20 MHz band, but seems to have lasted longer than usual.

Going up to 30 MHz, an extremely good opening to VKY occurred on 14th and 15th Nov. The band opened on 14th Friday night and did not close until the Sunday night.

Early in the New Year an opening occurred to VKA and Col TLE became the first station in the Zone to work VKA on 2 MHz.

Several new stations are on this band. They include ZLWB, ZLGP and ZLPL.

There are only two stations active on 422 Mc. They are Len TBAQ and Col TLE. Col has worked VKY on this band, which is an all Australian record. Reg TBL is also on, but cannot get into Launceston for his VKY QTH.

By the time this is in print, the TAJ Inter-State Memorial V.H.F. Contest should be over. Hope to hear plenty of activity. 13, May 63K.

## NORTH-WEST ZONE

Another very good roll-up to our February meeting with our President (Syd TBF) in the chair. Several visitors were welcomed including Peter ZLDR and we really saw some old member to the Zone, John TFK, who is now at Gorrive Park, and also Frank Richards, who is anxiously awaiting the results of the latest A.O.C.P. exams. Best of luck Frank.

We had an excellent illustrated lecture by our old friend, Len Jensen, called "40 Years of Ham Radio" and we really saw some old-time equipment being used. This was followed by a talk with some professional looking colour slides by Len and we really saw some of his recent trip to New Zealand. It was very interesting to see some of the ZL boys that we have had QSOs with in the last few years. A very enjoyable evening.

Yours truly had his first introduction to v.h.f. mobile the other evening when Kevin ZEA3J called me on 144 MHz and I was in Winston TZWV with 5 by 5 s.s. all round. Could be another convert to v.h.f. mobile. There has been quite a lot of activity on the v.h.f. bands here lately and some interstate contacts have been made.

Don't forget the Annual Dinner to be held in Hobart, club in the evening.

Next meeting a check will be made to see what equipment is available, suitable for the W.I.C.E.R. net. Check up on your mobile and portable rigs and make sure they are in working order. 13, May 63K.

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